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Three Empirical Contributions from the Perspective of the New Economic Geography

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La Faculté n'entend donner aucune approbation ou improbation aux opinions émises dans les thèses. Ces opinions doivent être considérées comme propres à leurs auteurs.

To my parents,

my sister,

my cousin,

Oscar and Molly.

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Acronyms

ACIA	ASEAN Comprehensive Investment Agreement
ADB	Asian Development Bank
AIA	Framework Agreement on the ASEAN Investment Area
AICO	ASEAN Industrial Cooperation Scheme
ASEAN	Association of Southeast Asian Nations
ASEAN-CLMV	The ASEAN members that are Cambodia, Laos, Myanmar, and Vietnam
ASEAN+3	ASEAN + China, Japan, and the Republic of Korea
ASEAN-6	Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand (unless indicated otherwise)
AEC	ASEAN Economic Community
AFTA	ASEAN Free Trade Area
APEC	Asia-Pacific Economic Cooperation
BIT	Bilateral Investment Treaty
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CEPT	Common Effective Preferential Tariff
COMTRADE	Commodity trade database of the United Nations Statistics Division
EFTA	European Free Trade Association

ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
EU	European Union
FDI	Foreign Direct Investment
FMA	Foreign Market Access
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GDPC	Gross Domestic Product per Capita
ISIC	International Standard Industrial Classification
MERCOSUR	Southern Common Market in Latin America
MFN	Most-favored nation
NAFTA	North American Free Trade Agreement
NEG	New Economic Geography
OECD	Organisation for Economic Co-operation and Development
RTA	Regional Trade Agreement
TRAINS	Trade Analysis and Information System
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
WITS	World Integrated Trade Solution
WTO	World Trade Organization

"International trade theory cannot be understood

except in relation to and as part of the general location theory,

to which the lack of mobility of goods and factors has equal relevance."

Bertil Ohlin, 1968

"Southeast Asia is a region of great diversity–its politics, religions,

and levels of economic development. This diversity was, and still is,

a compelling reason for regional integration and co-operation.

But diversity also poses a significant impediment to such efforts."

Goh Chok Tong,
Singapore Former Prime Minister, 2002

Résumé en français

Contexte

Le processus d'intégration économique régionale des pays de l'Association des nations de l'Asie du Sud-Est (ANASE ou ASEAN [1]), composée de dix membres tels que Brunei Darussalam, Cambodge, Indonésie, Laos, Malaisie, Myanmar, les Philippines, Singapour, Thaïlande et Vietnam, s'est considérablement intensifié au cours des deux dernières décennies. Cette dynamique est animée par la participation des pays membres à un nombre croissant d'accords sur le commerce, l'investissement et le partenariat économique, ainsi que le progrès dans le développement régional des liaisons de transport (Das et Thao, 2013). En outre, le désir de transformer la zone de libre-échange de l'ASEAN (*ASEAN Free Trade Area*–AFTA) en marché commun avec la création de la Communauté économique de l'ASEAN (*ASEAN Economic Community*—AEC) à l'horizon 2015, illustre bel et bien l'objectif ultime de l'ASEAN d'approfondir le processus d'intégration économique régionale.

L'AEC est le pilier économique de la Communauté de l'ASEAN à venir, avec les deux autres piliers que sont la Communauté politique et de sécurité de l'ASEAN et la Communauté socioculturelle de l'ASEAN. Son objectif principal, comme indiqué dans la « Déclaration sur le Plan d'action économique de l'ASEAN » également nommé « *AEC Blueprint* », est de transformer l'ASEAN en « (*i*) un marché unique et une base de production dans lequel il y aura une libre circulation des biens, services, investissements et capitaux ; (*ii*) une région économique fortement concurrentielle, (*iii*) une région de développement économique équitable, et (*iv*) une région entièrement intégrée dans l'économie

1. Bien que le sigle officiel français soit ANASE, le sigle anglais ASEAN désignant *Association of Southeast Asian Nations* est plus souvent utilisé. Nous allons opter pour cette appellation par la suite.

mondiale » (ASEC, 2008). Atteindre ces buts soulève un certain nombre de défis pour les pays de l'ASEAN étant donné les opportunités et menaces que pourrait engendrer l'intégration grandissante.

D'une manière générale, le fait de baisser des barrières commerciales et d'améliorer la connectivité transfrontière vient changer les conditions des échanges et les flux de facteurs de production pour devenir plus mobiles. Il améliore l'accès au marché ; les marchandises peuvent être échangées et livrées plus facilement et en temps requis, en permettant aux pays de fournir leurs produits à une clientèle plus large et dans des endroits plus éloignés. On s'attend à ce que la baisse des barrières aux échanges contribue à l'essor des réseaux régionaux de la production dans l'ASEAN (Corbett and Umezaki, 2008). En outre, il est espéré que l'intégration garantira davantage d'entrées de capitaux étrangers, en particulier, des afflux des Investissements Directs à l'Etranger (IDE) (Büthe et Milner, 2008 ; Uttama et Péridy, 2009), puisque les firmes multinationales seraient attirées par la demande potentielle du marché élargi et la capacité de la région à approvisionner des intrants. En conséquence, l'approfondissement de l'intégration de l'ASEAN est considéré comme une source des afflux en devises étrangère sous forme de revenu, de création d'emplois, et d'afflux de capitaux étrangers, en fournissant aux pays les opportunités de tendre vers la croissance économique substantielle.

D'autre part, l'amélioration des conditions de l'échange et du transport mentionnée plus haut devrait permettre également aux firmes de décider de leur localisation au sein de l'espace intégré. Afin de profiter de la plus grande demande de biens et la provision des intrants, beaucoup d'entre elles auront tendance à concentrer leurs activités de production à proximité de grands marchés, qui se trouvent habituellement dans les régions les plus développées. À cet égard, l'intégration de l'ASEAN pourrait favoriser l'agglomération d'activités de production dans des régions économiques centrales, renforçant ainsi des disparités régionales déjà existantes.

Ainsi, les opinions sur la perspective d'approfondir l'intégration de l'ASEAN sont divergentes. D'une part, il y a la vision optimiste que l'intégration entraînerait une croissance économique grâce à l'expansion du commerce et de l'attractivité d'IDE. D'autre part, il y a la crainte que les pays membres à faible revenu, c'est-à-dire le Cambodge, le Laos, le Myanmar et le Viêtnam, qui sont également nommés les pays de « l'ASEAN-CLMV », auraient peu de

possibilités de croissance et seraient donc laissés marginalisés par les autres pays membres. Si les disparités territoriales deviennent trop importantes, elles représenteraient un danger pour la progression de l'intégration de l'ASEAN.

Cadre théorique et empirique

Dans le domaine de l'économie internationale, les préoccupations concernant les inégalités territoriales en raison de l'intégration croissante ne sont pas nouvelles. La mondialisation et la propagation de la libéralisation des échanges régionaux, en particulier la mise en place de l'Union européenne—UE (1993) et de l'Accord de libre-échange nord-américain—ALENA (1994), ont suscité la nécessité d'élaborer un nouveau cadre théorique du commerce international capable d'expliquer le cas particulier des économies intégrées. Ceci est parce que la théorie traditionnelle du commerce international de l'avantage comparatif adopte en effet une vue optimiste sur cette question : l'ouverture à l'échange induit des gains de productivité générés par la spécialisation interbranche à travers les pays plutôt que l'agglomération des activités économiques, de sorte que l'on s'attend à une réduction des écarts de revenu sur le territoire.

Ce qui rend pertinente la localisation des firmes dans le commerce international est l'existence « des coûts de commerce » (*trade costs*) et des rendements d'échelle internes à la firme. Krugman (1980) a incorporé avec succès ces deux variables dans un nouveau cadre théorique en combinant le concept de l'économie régionale à la nouvelle théorie du commerce international en concurrence monopolistique (Dixit et Stiglitz, 1977 ; Krugman, 1979 ; Helpman et Krugman, 1985).[2] Les coûts à l'échange incitent des firmes à s'installer au plus près des marchés, tandis que les économies d'échelle les incitent à concentrer leurs activités de production dans un nombre restreint de sites de production. De plus, le plus grand potentiel marchand (en terme de rentabilité) prévalant dans les grands marchés influence la décision des firmes à s'y localiser, donnant lieu à « l'effet de taille de marché » (Krugman, 1980 ; Helpman et Krugman, 1985). Les facteurs de production tels que le travail et les biens intermédiaires, considérés comme mobiles, seraient attirés vers ces sites par le mécanisme d'ag-

2. Il est également possible d'étendre le cadre d'analyse vers d'autres types de structures de marchés comme par exemple les travaux de Combes (1997) et Head *et al.* (2002) en concurrence de Cournot avec libre entrée.

glomération qui suit un processus de « causalité cumulative », c'est-à-dire que plus de firmes sont nombreuses, plus elles attirent les facteurs de production, qui à leur tour tendent à attirer davantage de firmes. Krugman (1991) explique ce mécanisme d'agglomération par les flux migratoires de travailleurs, entraînant une distribution « centre-périphérie » des activités industrielles où le centre correspond aux régions économiquement centrales. Par ailleurs, Krugman et Venables (1995) démontre que cette forme de répartition spatiale peut être générée également par la mobilité des intrants à travers le commerce des biens intermédiaires entre firmes.

Le développement de ces modèles canoniques constitue le corpus théorique d'une nouvelle discipline du commerce international qui s'intitule « la nouvelle économie géographique (NEG). La théorie est soutenue par au moins trois monographies théoriques que sont Fujita *et al.* (1999) ; Fujita et Thisse (2002) ; et Baldwin *et al.* (2003), donnant lieu à la mise au point des études empiriques ultérieures. De nombreuses revues de littérature sur les méthodologies empiriques montrent l'intérêt de tester la théorie avec des données réelles et que les travaux futurs dans le domaine de la NEG devraient être développées davantage dans cette direction. Brakman *et al.* (2001) et Overman *et al.* (2003) sont parmi les premières revues de cette sorte, tandis que Combes *et al.* (2008) et Combes (2011) fournissent une revue exhaustive des méthodologies empiriques appliquées dans les travaux de la NEG.

Il convient de noter que les applications économétriques de la NEG ont suivi différentes directions autour des prédictions des modèles théoriques de base. Les problèmes posés par l'intégration régionale concernent, par exemple (*i*) le changement du degré d'interactions spatiales entre entités économiques en raison de l'intégration commerciale (par exemple, sous forme de l'intensité des flux d'échanges), (*ii*) les caractéristiques de l'attractivité territoriale après l'ouverture aux échanges, et (*iii*) l'impact de l'agglomération sur la performance économique territoriale au sein de l'espace intégré lorsque les biens et facteurs de production deviennent de plus en plus mobiles.

Les travaux économétriques portant sur ces questions progressent principalement selon deux grandes approches. La première approche examine les interactions spatiales entre entités économiques et leur attractivité (les points *i* et *ii*) en s'appuyant sur le modèle de gravité comme outil empirique. La deuxième approche examine l'ampleur des économies d'agglomération (le point *iii*) qui

concerne les études autour de la variable d'accès au marché.

Le modèle de gravité a été en réalité appliqué dans des travaux empiriques du commerce international bien avant l'émergence de la NEG (Tinbergen, 1962). Bien que ses premières applications aient été critiquées pour leur manque de fondements théoriques, la gravité est restée la relation la plus stable entre économie et géographie (Leamer et Levinsohn, 1995), prédisant des flux commerciaux bilatéraux entre pays par leur taille comme le PIB, qui constitue des forces d'attraction, et par les forces de résistance comme la distance. Compte tenu de son pouvoir explicatif, le modèle gravitationnel retrouve également son application par d'autres types de flux, tels que les IDE (Bergstrand et Egger, 2007 ; Daude et Stein, 2007 ; Head et Ries, 2008 ; Kleinert et Toubal, 2010) ou la migration (Karemera *et al.*, 2000; Orefice, 2012). De plus, les résultats d'estimations du modèle théorique de gravité peuvent servir à calculer les coûts de commerce bilatéraux, qui peuvent être demandés par certains travaux empiriques de la NEG puisque les observations directes sont souvent rares et inexactes (Anderson et van Wincoop, 2004, p. 693). [3]

Dans la seconde approche de la littérature, les travaux autour de la variable d'accès au marché suivent les prédictions théoriques sur la façon dont les firmes s'ajustent aux différentiels de rentabilité entre diverses localisations. Le pays ayant un bon niveau d'accès au marché connaît une rentabilité plus élevée, attirant ainsi les activités industrielles des firmes qui vont desservir les autres marchés par le biais des exportations. Tel est l'objet principale des études portant sur l'effet de taille de marché (Davis, 1998; Davis and Weinstein, 1999, 2003; Crozet and Trionfetti, 2008). L'équilibre partiel démontrant la relation entre la performance à l'exportation et l'accès au marché est également étudiée à travers l'équation structurelle des exportations de Redding et Venables (2003). Une autre voie d'ajustement aux différentiels de rentabilité, qui n'impose pas la relocalisation des firmes, passe par une augmentation des prix des facteurs (par exemple, les salaires) dans le territoire ayant un bon accès au marché ; étant donné le plus grand potentiel marchand de ce territoire, les firmes peuvent se permettre de payer une rémunération plus élevée aux salariés. En conséquence, on tend à observer une structure spatiale des niveaux de salaire dans laquelle les rémunérations sont plus élevées dans les régions du centre éco-

3. Ces travaux sont par exemple Redding et Venables2003, Redding et Venables (2004a) ; Head et Mayer (2006) ; Hering et Poncet (2010).

nomique et diminuent à la périphérie. Ce type d'études compte sur l'équation structurelle de salaire comme outil empirique (par exemple l'équation (4.35) dans Fujita *et al.* (1999, p. 55)) et constitue la majorité des travaux empiriques autour de la variable d'accès au marché (Redding et Venables, 2004a ; (Hanson, 2005) ; Head et Mayer (2006), Amiti et Cameron, 2007).

Objectif de la thèse

Ces pistes de recherche nous amènent à étudier, dans le cadre de notre thèse, les impacts économiques de la libéralisation du commerce et de l'investissement au sein de l'ASEAN en appliquant les méthodologies empiriques de la NEG. Nous souhaitons apporter un nouveau regard sur les études quantitatives existantes de cette intégration régionale à travers la problématique générale formulée autour des questions suivantes : « La portée empirique des modèles de la NEG peut-elle s'étendre aux études de l'impact de la libéralisation commerciale et de l'investissement de l'ASEAN ? » « Autrement dit, les équations fondamentales de la NEG sont-elles pertinentes pour expliquer l'impact économique de l'intégration ? » « Peuvent-elles fournir les perspectives quant à la tendance économique, au moins sur certains objectifs du Plan d'action de l'AEC, comme, par exemple, la compétitivité commerciale, les inégalités territoriales, et la libre circulation des investissements ? »

Plus précisément, en utilisant les données disponibles sur le commerce et les IDE relative aux pays de l'ASEAN, nous cherchons à déterminer si la portée empirique de la NEG peut nous aider à répondre aux questions suivantes :

- La libre circulation de marchandises augmente-elle durant ces deux dernières décennies, depuis la formation de la zone de libre-échange de l'ASEAN ou l'AFTA ?
- L'insertion dans les marchés régionaux et mondiaux favorise-elle la compétitivité en termes d'exportation des pays de l'ASEAN ?
- L'intégration commerciale tend-t-elle à réduire ou aggraver les inégalités territoriales au sein de l'ASEAN ?
- La libéralisation des investissements promeut-elle les afflux des investissements étrangers ?

Ces questions seront abordées successivement au cours de **trois** chapitres. Le Chapitre 2 évalue la baisse des coûts de commerce suite au processus d'intégra-

tion commerciale. Il examine également le lien entre accès au marché (en raison de l'intégration croissante) et performance exportatrice des pays. Le Chapitre 3 étudie l'impact de la libéralisation commerciale sur les inégalités régionales tandis que le Chapitre 4 s'intéresse à l'impact de la libéralisation des investissements sur l'attractivité d'IDE des pays de l'ASEAN.

Quant à la portée empirique de la NEG, le mécanisme sous-jacent des études dans les Chapitres 2 et 3 est l'impact de l'accès au marché, incorporé respectivement dans l'équation structurelle d'exportation (Redding et Venables, 2003) et l'équation de salaire (Redding et Venables, 2004a). Par ailleurs, la relation gravitationnelle constitue la base de l'analyse du chapitre 4.

Il convient de noter que la variable d'accès au marché, qui est nécessaire dans les analyses menées dans les 2 et 3, requiert la connaissance des coûts de commerce bilatéraux qui sont l'une des composantes principales de cette variable. A cet égard, deux méthodes différentes ont été appliquées pour les mesurer indirectement à partir de données commerciales bilatérales. La mesure des coûts de commerce dans le Chapitre 2 est obtenue à partir d'une simple formule dont l'avantage réside dans la faible quantité de données nécessaires. Cependant, l'inconvenant de cette méthode est le manque de données commerciales dans certains pays. Afin de contourner ce problème, le Chapitre 3 recourt à l'estimation du modèle de gravité et utilise les coefficients estimés pour calculer les coûts. Bien que cette dernière méthode puisse exiger des données supplémentaires que celles du commerce, et qu'elle soit plus sophistiquée à entreprendre, nous pouvons spécifier l'équation de gravité de telle sorte qu'il soit possible de calculer les coûts de commerce, même pour les pays disposant de données commerciales manquantes.

Enfin, il existe plusieurs raisons qui justifient que le cas d'intégration de l'ASEAN est intéressant pour une étude appliquée de la NEG. En effet, les pays sont de plus en plus engagés dans les processus de réduction des coûts de commerce intra- et inter-régionaux mentionnés plus haut. L'AFTA ainsi qu'un certain nombre d'accords préférentiels sur le commerce ont vu le jour depuis un peu plus de deux décennies, suggérant que les pays de l'ASEAN ont commencé à ressentir certains impacts économiques liés à la baisse des coûts de commerce. De plus, la région est caractérisée par une grande diversité entre pays membres, que ce soit en termes de développement économique, de caractéristiques géographiques, ou de contexte historique et culturel. Ces asymétries

influenceraient les décisions de localisation d'activités industrielles en faveur des plus grands marchés présents dans les pays à revenu élevé, renforçant ainsi d'autant plus la disparité régionale. Par ailleurs, le cas de l'ASEAN peut démontrer qu'il est possible de généraliser les attentes théoriques de la NEG aux études d'une région en voie de développement. Cela contribue aux travaux qui tendent à confirmer la pertinence des modèles canoniques de la NEG : beaucoup d'entre eux ont, jusqu'ici, privilégié les données en provenance de pays développés tels que les États-Unis, les pays membres de l'Union européenne ou de l'Organisation de coopération et de développement économiques (OCDE).

Les sous-sections ci-après sont consacrées à la synthèse des objectifs et des méthodologies empiriques adoptées dans les trois chapitres empiriques que contient cette thèse.

Chapitre 2 : Intégration commerciale et performance à l'exportation des produits manufacturés

L'objectif de ce chapitre est triple, mettant l'accent sur l'évaluation du progrès d'intégration de l'ASEAN en termes de réduction des coûts de commerce, les déterminant de cette baisse des coûts, et les conséquences de l'intégration sur accroissement des exportations. Les méthodologies empiriques employées dans ce chapitre comportent alors une stratégie visant à mesurer des coûts de commerce et une étude économétrique de l'équation structurelle d'exportation.

La mesure des coûts de commerce utilisée dans ce chapitre doit être en mesure de nous fournir un indicateur d'intégration comparable entre pays et sur plusieurs années. Nous utilisons l'indicateur de Novy (2009) qui correspond à l'expression de la gravité théorique en l'absence de toutes frictions aux échanges (Anderson and van Wincoop, 2003). [4] En effet, les résultats d'analyse économétrique sur les déterminants des coûts de commerce nous confirment la

4. L'indice de Novy est fondé sur la mesure « d'ouverture au commerce » (*trade freeness*) de Head et Ries (2001), Baldwin et al. (2003), Head et Mayer (2004), qui est également connu dans la litérature de la NEG sous le nom de « phi-ness ». Il est servi comme une mesure du degré d'intégration du commerce bilatéral et correspond à une comparaison entre flux commerciaux inter- et intra-régionaux (les flux intra-régionaux désignent la situation de parfaite intégration). La formulation de la phi-ness est obtenue à partir d'une transformation de l'équation théorique de la gravité de telle sorte que l'expression ne comporte ni terme de taille économique (PIB) ni terme de « résistance multilatérale » (*multilateral trade resistance*), le dernier étant la composante de la gravité théorique (Fontagné *et al.*, 2002 ; Anderson et van Wincoop, 2003).

pertinence de l'indice de Novy par rapport aux barrières actuelles aux échanges prévalant dans les pays de l'ASEAN, puisque l'ensemble des variables comme les caractéristiques géographiques et les politiques commerciales comme les accords de commerce préférentiels, les barrières tarifaires, et les mesure de facilitation des échanges, peut expliquer plus de 70% des variations de l'indice Novy.

Concernant l'étude des bénéfices de l'intégration, nous cherchons à évaluer dans quelle mesure l'amélioration des conditions d'accès au marché étranger (*foreign market access*) peut expliquer la performance à l'exportation des pays de l'ASEAN. Selon l'équation structurelle d'exportation (Redding et Venables, 2003), mis à part la capacité d'approvisionnement (*supplycapacity*), la région avec un bon niveau d'accès au marché tend à exporter davantage par rapport que les autres. De ce fait, on pourrait s'attendre à ce que la relation positive entre exports et accès au marché implique une tendance vers l'amélioration de l'exportation en raison du renforcement d'intégration. En revanche, il est important de noter que les effets prédits par l'économie géographique et ceux prédits par la théorie de l'avantage comparatif ne sont pas mutuellement exclusifs ; il nous semblerait alors logique de tenir compte aussi du rôle exercé par d'autres variables influençant la capacité d'approvisionnement telles que le salaire, l'offre de travail, les IDE et l'environnement propice à l'exportation.

L'analyse présentée dans ce chapitre fait appel aux données commerciales au niveau industriel pour mesurer les coûts de commerce et pour construire la variable d'accès au marché. Jusqu'à présent, la littérature nous fournit des preuves empiriques substantielles concernant la relation positive entre performance à l'exportation et accès au marché à travers des pays (Redding et Venables, 2003 ; Fugazza, 2004). Il serait alors intéressant de tester la pertinence de cette relation au niveau plus désagrégé. Compte tenu de la disponibilité des données, notre échantillon ne comporte que des principaux pays de l'ASEAN, à savoir l'Indonésie, la Malaisie, les Philippines, le Singapour, la Thaïlande et le Vietnam, dans 22 secteurs selon la classification à deux chiffres de la CITI Rév. 3 et durant la période 1990 au 2010.

Un second avantage lié à l'utilisation des données désagrégées est la prise en compte de l'hétérogénéité inter-industrielle en termes de substituabilité entre différentes variétés de biens. Cette hétérogénéité entraîne des conséquences sur les coûts de commerce et la performance à l'exportation.

Si la différentiation des produits n'est pas grande, c'est-à-dire si les variétés

domestiques et importés sont fortement substituables, les consommateurs auront tendance à avoir une forte demande pour la diversité (en terme de variétés de biens) et seront ainsi moins sensibles à la variation de prix associée aux coûts de commerce supportés par les variétés importées. En conséquence, les échanges ne seront pas affectés fortement par une petite variation des coûts de commerce.

En revanche, une conséquence pour les exportateurs est que la forte demande pour la diversité conduira des régions dotées d'un bon accès au marché à exporter davantage par rapport aux régions ayant un faible niveau d'accès au marché. En outre, l'utilisation des données sectorielles nous permet d'examiner comment la nature de biens peut affecter le niveau des coûts de commerce. Par exemple, ces coûts sont relativement plus élevés pour les biens qui sont difficiles à transporter, c'est-à-dire ayant une faible transportabilité en termes de poids par rapport à sa valeur, ou les biens périssables qui sont sensibles à la durée des échanges.

Chapitre 3 Intégration régionale et inégalités de revenu par habitant

La baisse des coûts de commerce, bien que favorable aux producteurs et consommateurs dans son ensemble, peut être à l'origine d'une divergence croissante entre pays. En effet, la question des inégalités du développement est l'une des questions les plus controversées de l'ASEAN, notamment les disparités qui existent entre membres les plus récents (les pays de l'ASEAN-CLMV) et les membres anciens. Cette inégalité se manifeste à travers l'indice de Gini du PIB par habitant qui s'élève à 70%, où zéro pour cent reflète une égalité parfaite [5]. Ce niveau d'inégalités est jugé relativement élevé en le comparant avec les niveaux d'autres groupes d'intégration régionale. Par exemple, il s'élève à 30% pour l'Union européenne [6], 36% pour l'Accord de libre échange nord-américain (ALENA) et 28% pour le Mercosur [7]. De plus, malgré les efforts d'intensification de l'intégration, censée être le moteur de croissance économique via la mobilité croissante des biens et capitaux, les écarts de revenu ne se réduisent

5. Commission économique et sociale pour l'Asie et le Pacifique ou CESAP (UNESCAP, 2010)

6. Extrait de *Eurostat database on living conditions and welfare, 2010*

7. Source : Blizkovsky (2012)

que très lentement.

Au cours de ce chapitre, nous cherchons à comprendre dans quelle mesure l'économie géographique peut façonner l'inégalité territoriale d'une région très hétérogène comme l'ASEAN. En examinant la pertinence de l'équation de salaire dans l'explication du développement territoriale de l'ASEAN, la méthodologie empirique suit alors celle de Redding et Venables (2004a), selon laquelle l'approximation du logarithme du salaire au niveau national est donnée par le logarithme du PIB par habitant dans chaque pays. Pour une fois de plus, la variable centrale dans l'analyse est l'accès au marché ; des valeurs élevées de l'accès au marché mènent à des salaires élevés, reflétant les mécanismes d'agglomération liés à la taille du marché.

L'indicateur d'accès au marché est construit pour chaque pays de l'ASEAN et couvre la période 1990-2010 en utilisant des résultats d'estimations du modèle gravitationnel. Contrairement au Chapitre 2 , les données commerciales employées ici sont des agrégés de l'ensemble du secteur manufacturier de façon à prendre en compte tous les pays de l'ASEAN dans l'échantillon. En outre, de la même manière que Bosker et Garretsen (2012), l'équation de gravité tient compte explicitement des variables observables spécifiques au pays au lieu d'inclure des effets fixes qui est la pratique commune dans la littérature (Anderson et van Wincoop, 2003 ; Baldwin et Taglioni, 2006). Ainsi, nous sommes en mesure d'utiliser les coefficients estimés pour calculer l'indice d'accès au marché, malgré l'absence de données commerciales dans certains pays ou certaines années.

Dans la dernière section du chapitre, nous exploitons les résultats d'estimation de l'équation de salaire afin d'en montrer les implications concrètes à travers quelques expérimentations fictives et simples. En particulier, nous cherchons à montrer comment un choc exogène de politique publique visant à accroître l'accès au marché peut affecter l'ajustement spatial de revenu des pays de l'ASEAN. Cet exercice peut être utile pour prédire la tendance des résultats des politiques mises en place par l'ASEAN afin d'éviter ou de réduire des disparités territoriales croissantes et d'assurer un développement économique équitable lorsque l'intégration s'approfondit.

Chapitre 4 : Libéralisation de l'investissement et attractivité des IDE : le rôle des traités bilatéraux d'investissement

Ce chapitre se penche sur l'impact de la libéralisation des investissements dans l'ASEAN avec un intérêt particulier pour le rôle joué par la mise en place des traités bilatéraux d'investissement (TBI) sur des afflux des IDE. La motivation de cette analyse est double. D'une part, les pays de l'ASEAN s'engagent dans un nombre croissant de ce type de traités depuis deux dernières décennies et, d'autre part, les études concernant l'impact quantitatif de TBI sont plutôt récentes. [8] Par ailleurs, il n'existe pas encore, dans la littérature, un consensus général sur l'impact de TBI ; et sur le fait que les traités promeuvent effectivement les entrées d'IDE dans les pays d'accueil signataires qui, pour la plupart, sont des pays en voie de développement. Par conséquent, ce chapitre vise à combler cette lacune de la littérature existante. De plus, nous étudions si l'efficacité des TBI est différente selon les origines des pays signataires que ce soit des pays développé ou en voie de développement.

Notre échantillon de données comporte des stocks bilatéraux d'IDE entrant dans les dix pays de l'ASEAN et en provenance de cinquante pays, dont vingt-sept sont des pays en voie de développement, sur la période de 1990 à 2007. Le modèle de gravité pour les IDE, qui est notre outil empirique, est inspiré de la gravité structurelle de Kleinert et Toubal, 2010 qui, de la même manière que le modèle de gravité de commerce, comprend des variables telles que le PIB et certaines formes de frictions qui sont des barrières à l'entrée des IDE. De plus, la gravité est dérivée à partir de deux types de modèles du commerce international en présence de firmes multinationales, à savoir, le modèle de proximité-concentration (Brainard, 1997; Helpman *et al.*, 2004) et le modèle du facteur de proportion (Venables, 1999b), nous permettant au final de déterminer si les afflux d'IDE dans l'ASEAN est de nature horizontale ou verticale.

Nous considérons deux types d'obstacles aux investissements dans la gravité, à savoir la qualité des institutions et le degré d'ouverture du compte de capital. Nous nous attendons à ce que l'entrée en vigueur d'un traité soit accompagnée par une augmentation d'IDE d'une manière directe et indirecte ;

8. Les premières contributions sont telles que Hallward-Driemeier (2003), Egger et Pfaffermayr (2004) ; Neumayer et Spess (2005) et Tobin et Rose-Ackerman (2005).

plus précisément, l'effet indirect repose sur le postulat que les TBI atténuent ces barrières en agissant comme substituts pour un environnement propice aux investissement afin d'attirer des IDE.

Enfin, l'ensemble de ces questions sont examinées à travers l'une des méthodes d'estimation appliquée récemment à la gravité d'IDE afin de tenir compte la présence d'afflux d'IDE d'une valeur nulle qui sont relativement importants dans notre échantillon (Silva et Tenreyro, 2006 ; Desbordes et Vicard, 2009 ; Kleinert et Toubal, 2010).

Principales constatations et conclusions

Dans une large mesure, le processus d'intégration de commerce et d'investissement de l'ASEAN est conforme aux prédictions des modèles de la NEG selon lesquelles les emplacements avec un bon accès au marché sont attractifs en tant que lieux d'exportation (Chapitre 2), bien que les coûts des facteurs de production y soient également plus élevés (Chapitre 3), et que la relation spatiale entre deux entités économiques diminue avec la distance qui les sépare (Chapitre 4). Plus précisément, les résultats obtenus dans les Chapitres 2 et 3 suggèrent que l'amélioration de la proximité au marché des pays partenaires constitue un avantage à la croissance des exportations de biens manufacturiers de l'ASEAN bien que le renforcement de l'intégration conduit potentiellement à l'existence de déséquilibres économiques entre les pays. Puisque les marchés sont devenus spatialement dépendants par le processus d'intégration croissant, le dynamisme économique des pays partenaires intra- et inter-régionaux semble exercer une influence sur le commerce et la performance économique de l'ASEAN.

Par ailleurs, la relation gravitationnelle du Chapitre 4 nous suggère que l'attractivité des IDE dépend également des conditions propices à l'investissement liées à la qualité des institutions et l'ouverture aux capitaux. La libéralisation des barrières aux investissements à travers, notamment des traités bilatéraux d'investissement (TBI) peut s'avérer efficace pour réunir ces conditions.

La portée de cette thèse ne permet pas une étude exhaustive de l'ensemble des objectifs d'intégration de l'ASEAN qui sont posés dans le Plan d'action de l'AEC. Néanmoins, elle aboutit à quelques recommandations politiques en vue de réaliser un certain nombre de ces objectifs ; objectifs qui sont représentés par le double défi, externe et interne, auquel est confrontée l'ASEAN. Le défi

externe concerne la relation entre l'ASEAN et le reste du monde, autrement dit la façon dont les pays peuvent atteindre une libre circulation des marchandises, des investissements et des capitaux, tout en continuant à conserver une capacité d'insertion dans l'économie mondiale. En outre, le défi interne pose la question des difficultés de l'ASEAN à faire face aux disparités économiques territoriales. Les conclusions tirées de cette thèse mettent en lumière la perspective de certains plans d'action de la Communauté économique de l'ASEAN.

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Chapter 1

General Introduction

1.1 Context

The past few decades have been a significant acceleration in the economic integration process of the Association of Southeast Asian Nations, or ASEAN, comprising of ten member countries, namely, Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. This dynamic is driven by the countries being involved in a growing number of agreements on trade, investment and economic partnership, as well as the progress in developing regional transport connectivity (Das and Thao, 2013). Moreover, the intention to transform ASEAN Free Trade Area (AFTA) into a common market, with the creation of ASEAN Economic Community (AEC) by the end of 2015, reflects ASEAN's ultimate goal to deliberately push forward greater regional economic integration.

The AEC is the economic pillar of a larger plan for the ASEAN Community, along with two other pillars that are ASEAN Political-Security Community and ASEAN Socio-Cultural Community. The main objective of the AEC as identified in a roadmap for AEC or the AEC Blueprint, is to turn ASEAN into "a single market and production base in which there is a free flow of goods, service, investment and capital; a highly competitive economic region; a region of equitable economic development; and a region fully integrated into the global economy".[1] Achieving these goals raises a number of challenges for the ASEAN countries given that there are potential opportunities and threats arising from

1. Extracted from the "Declaration on the ASEAN Economic Blueprint" (ASEC, 2008).

a growing integration.

Lowering trade barriers and improvement of trans-border connectivity change conditions of trade in goods and factor flows to become more mobile. They improve accessibility to markets, goods can be traded and delivered more easily and in due time, allowing the countries to supply their products to more customers and at more remote places. Declining trade barriers can also lift collective production efficiency by facilitating more efficient use of economic resources through development regional production networks (Corbett and Umezaki, 2008). In addition, it is hoped that the integration will ensure further inflows of foreign capital, particularly foreign direct investment (FDI) (Büthe and Milner, 2008; Uttama and Péridy, 2009), as multinationals would be more attracted by potential demand of the enlarged market and the region's capacity in supplying inputs. So deepening ASEAN integration is deemed as a source of foreign exchange earnings, employment creation, inflows of foreign capital, providing the countries with substantial opportunities for economic growth.

On the other hand, the improved trade and transport conditions aforementioned would also allow firms to decide on their locations within the integrated space. In order to benefit from larger demand for goods and supply of inputs, many of them will tend to concentrate their production activities at the proximity to large markets which are usually located in more developed countries. In this regard, the ASEAN integration is inclined to favor agglomeration of production activities in economic centers, enhancing the already existing regional disparities.

So there are mixed opinions about the prospect of deepening ASEAN integration. On the one hand, there is an optimistic view that the integration would entail economic growth through trade expansion and FDI attractiveness. On the other hand, there is a fear that the lower-income members, i.e., Cambodia, Laos, Myanmar, and Vietnam, or the ASEAN-CLMV countries, may be provided with only limited opportunity for growth and thus will be left behind by the other. If economic disparities among member countries become too wide, it would represent the danger for the ASEAN countries to sustain further progress of the integration.

1.2 Theoretical and Empirical Framework

In the field of international economics, concerns about widening regional disparities as a result of integration are not a new issue. Globalization and the spread of regional trade liberalization, in particular, the establishment of the European Union (EU) in 1993 and the North American Free Trade Agreement (NAFTA) in 1994, motivated the development of a new trade framework capable of explaining this puzzling landscape of integrated economies. This is because the traditional trade theory of comparative advantage shows a somewhat optimistic view on the issue, i.e., trade liberalization induces productivity gains across countries generated by inter-industry specialization rather than agglomeration of economic activities, thereby expecting to close down spatial income gaps.

What makes firm location relevant in international trade is the existence of trade costs and firm's internal increasing returns. Krugman (1980) successfully incorporated the two ingredients into a new framework by combining the concept of regional science to the new trade theory under monopolistic competition (Dixit and Stiglitz, 1977; Krugman, 1979; Helpman and Krugman, 1985). [2] Trade costs incite firms to locate at the proximity to markets, whereas scale economies induce them to concentrate their production activities in a single location or in a small number of production sites. Moreover, greater market potential (in terms of profitability) prevailing in large markets tends to influence firms' decision to locate there, giving rise to "home-market effect" (Krugman, 1980; Helpman and Krugman, 1985). Production factors such as workers and intermediate goods, which are considered mobile in this framework, would be attracted to these locations through agglomeration mechanism which follows a "cumulative causation" process, i.e., more firms attract more production factors, and more production factors attract more firms and so on. Krugman (1991) explains this agglomeration mechanism by migration flows of workers, entailing a core-periphery distribution of industrial activities where the core being locations of economic centers. Krugman and Venables (1995) demonstrate another possibility of agglomeration through mobility of inputs, or trade in intermediates between firms, that also gives rise to this spatial

2. The literature, however, goes on to assume other types of market structure. Results by Combes (1997) and Head *et al.* (2002) suggest that the models could also rely on Cournot competition with free entry.

distribution of economic activities.

The development of these canonical models constitutes the theoretical corpus of a new trade discipline which is known as "new economic geography (NEG)". The theory has been consolidated by at least three theoretical monographs that are Fujita *et al.* (1999); Fujita and Thisse (2002); and Baldwin *et al.* (2003), allowing empirical applications to develop afterward. A number of surveys on empirical methodologies show the interest of testing the theory with real facts and that the future avenue of NEG studies should be developed more in this direction. Brakman *et al.* (2001) and Overman *et al.* (2003) are among the first surveys of this kind, whereas Combes *et al.* (2008) and Combes (2011) provide a comprehensive review on empirical methodologies applied in NEG studies.

Econometric applications in NEG have grown since then in many directions around the predictions of canonical theoretical models. Some highlighted issues that have been investigated regarding regional trade integration are for instance, (*i*) changes in the degree of spatial interactions (e.g., trade intensity) between economic entities as a result of trade integration; (*ii*) characteristics of locations that define their attractiveness to economic activities after they have opened up to trade; (*iii*) the effect of agglomeration on economic performance, or regional development, within the integrated space as goods and factors are becoming increasingly mobile.

The studies on these issues have progressed mainly along two approaches. The first approach investigates the spatial interactions between economic entities and their attractiveness (e.g., issues *i* and *ii*) which relies on the familiar gravity model as empirical workhorse. The second approach investigates the extent of agglomeration economies (e.g., issue *iii*) which concerns the studies around market access variable.

Gravity model has actually been applied in the empirics of international trade long before the emergence of NEG theory (Tinbergen, 1962). Although the early applications of the model is criticized for lacking theoretical foundation, the gravity remains the most stable relationship between economics and geography (Leamer and Levinsohn, 1995), predicting bilateral trade flows between countries by their sizes (e.g., GDPs) which constitute the attraction forces, and by frictions to trade which are represented by distance among others. Given the empirical success of the gravity in international trade, the model

has also been applied to other types of flows, such as FDI (Bergstrand and Egger, 2007; Daude and Stein, 2007; Head and Ries, 2008; Kleinert and Toubal, 2010) or migration (Karemera *et al.*, 2000; Orefice, 2012). In addition, estimates of theoretical gravity can serve to calculate bilateral trade costs, which can be helpful for other NEG empirical works that require trade cost measure since the direct observations are often scarce and can be inaccurate (Anderson and van Wincoop, 2004, p. 693). [3]

Empirical studies around market access follow theoretical predictions on how firms adjust to profit differentials across locations. This process takes place either through quantity adjustment, i.e., relocation of firms' production activities, or through factor price adjustment, e.g., increasing wages. A country endowed with good market access yields high profitability, thereby attracting production activities to locate there more than proportionally to the home market size. Localized firms then use this as a site to serve the other markets through exports. These are the studies about home-market effect–HME (Davis, 1998; Davis and Weinstein, 1999, 2003; Crozet and Trionfetti, 2008). The partial equilibrium which states the relationship between export performance and market access is also investigated by the structural export equation of Redding and Venables (2003).

However, the first series of studies on home-market effect by Davis and Weinstein failed to provide significant evident. Behrens *et al.* (2005, 2007); Suedekum (2007) and Behrens *et al.* (2009) suggest that one of the explanations could be related to omission of spatial influence arising from the third partner country. These authors, therefore, extended the HME framework to the multi-country case and have shown that the HME effect is actually present if the third-country effect has been controlled for. Nonetheless, Isono (2008), who applied this third-country approach to ASEAN's manufacturing exports, still did not find evidence for the HME.

While quantity adjustment appears to be not so responsive to variations in market access, another possibility of profit adjustment without relocation of firms is through an increase in factor price. In fact, given higher market potential, the region with good market access see their local factor prices increase because firms can afford to pay. As a result, we tend to observe a spatial wage

3. See the for example Redding and Venables (2003, 2004a); Head and Mayer (2006); Hering and Poncet (2010).

structure such that wages are higher in economic centers and become lower at the peripheries. This class of studies relies on the structural wage equation (e.g., equation (4.35) in Fujita *et al.* (1999, p. 55)) and constitutes the majority of empirical works around market access (Redding and Venables, 2004a; Hanson, 2005; Head and Mayer, 2006; Amiti and Cameron, 2007).

1.3 Objective and Outline of the Thesis

This thesis dissertation deals with applications of NEG empirical methodologies to investigate economic impact of the ASEAN trade and investment liberalization. It aims at bringing a new perspective to existing quantitative studies on ASEAN integration [4] with general research questions that are: "Do the empirics of NEG provide a suitable analytical tool to investigate the impact of trade and investment liberalization in the context of ASEAN integration?" "Are the fundamental equations of NEG relevant in explaining economic impact of the integration?" "Can they provide economic outlook, at least, on some of the integration goals identified by the AEC Blueprint that are related to trade competitiveness, regional inequality, and free flows of investment?" Specifically, making use of available trade and FDI data on the ASEAN countries, I study whether the empirics of NEG help us to answer the following questions:

- Does goods mobility substantially increase in the past two decades since the formation of ASEAN Free Trade Area?
- Does trade integration into both regional and global markets increase export competitiveness of the ASEAN countries?
- Does trade integration tend to close down or widen regional inequalities in ASEAN?
- Does investment liberalization promote inflows of foreign investment?

4. Many of these works have applied the trade gravity model to investigate the effect of AFTA's trade creation and trade diversion. The results are however mixed: studies by Elliot and Ikemoto (2004); Gosh and Yamarik (2004) and Cernat (2001) found that AFTA lead to net trade creation, while Dee and Gali (2003) and Soloaga and Winters (2001) suggest that AFTA lead to net trade diversion. Trotignon (2010) finds that AFTA is a "building block" to global free trade, i.e., it favors imports from the rest of the world while also promoting intra-regional trade. However, an earlier study by Carrère (2006) rather finds that AFTA is a "stumbling block".

I address these questions in **three chapters**. Chapter 2 assesses trade integration progress in reducing trade costs and investigates the relationship between market access (i.e., deepening integration) and export performance. Chapter 3 focuses on the impact of trade liberalization on regional inequality whereas Chapter 4 is interested in investment liberalization and the countries' FDI attractiveness.

The empirical applications remain closely related to theoretical models of NEG framework. The mechanism that underlies the analysis in Chapters 2 and 3 is the working of market access, embedded respectively in the structural *export equation* (Redding and Venables, 2003) and the *wage equation* (Redding and Venables, 2004a). Besides, the *gravity relationship* underlies the analysis in Chapter 4.

It should be noted that the measure of market access in Chapters 2 and 3 requires the knowledge of bilateral trade costs that are one of the main components of market access. To this end, two different methods have been implemented to measure them indirectly from bilateral trade data. The measure of trade costs in Chapter 2 is obtained from a simple formula which has the advantage of low data requirement. There is, however, a drawback for this method since it cannot be applied to countries with missing trade values. To sidestep this issue, the methodology adopted Chapter 4 resorts to trade gravity estimation and calculates trade costs from the obtained estimated coefficients. Although this method may require additional observable data than those of trade and it can be more sophisticated to implement, we can specify the gravity equation such that it is possible to compute trade costs even for countries with missing trade data.

Finally, a couple of reasons justify why the case of ASEAN integration can provide an interesting ground for applied studies in NEG. The countries are increasingly engaged in the process of reducing intra- and inter-regional trade costs mentioned earlier. AFTA and a number of preferential trade agreements have been settled for over two decades, suggesting that the countries have started to experience some economic impact of declining trade costs. In addition, ASEAN region is characterized by great diversity between members, be it in terms of economic development, geographical features, and historic-cultural background. These asymmetries would influence location decisions of productive activities in favor of large markets in higher-income countries and

hence further enhancing regional disparity. More importantly, the study of the ASEAN case can be useful in demonstrating the generality of NEG theory in predicting economic integration effects in developing region. This contributes to the existing studies that test for empirical relevance which, for many of them, have so far privileged the data from developed countries such as the United States, member countries of the European Union or the Organisation for Economic Co-operation and Development (OECD).

In the following, I summarize the three empirical chapters with particular attention given to the empirical methodologies adopted in each of them.

Chapter 2: Trade Integration and Export Performance in Manufactures

The objective of this chapter is threefold, focusing on the progress of ASEAN integration in reducing trade costs, the sources of declining trade barriers, and potential benefits that exports of the ASEAN countries may gain from improved integration. Empirical methodologies applied in this chapter, therefore, involve the strategy of measuring trade costs and the econometric analysis of the structural export equation.

Required trade cost measure should be able to provide us with a comparable trade integration measure across countries and years. I use Novy (2009)'s index which is the "frictionless" specification of trade gravity equation Anderson and van Wincoop (2003). [5] In fact, results of econometric analysis on determinants of the calculated bilateral trade costs provide that the Novy index is relevant to the actual trade barriers of the ASEAN counties where geographical features (i.e., the natural proxy for transport costs) and some trade policy variables (e.g., preferential trade agreements, tariffs, trade facilitation measures) can explain more than 70% of the variations of the index.

Regarding empirical investigation of the integration benefit, I examine the

5. The Novy index is built from the measure of "trade freeness", also known as "phi-ness" in NEG literature, which is an indirect measure of trade costs proposed by the line of works such as Head and Ries (2001); Baldwin *et al.* (2003); Head and Mayer (2004). The index serves as the degree of bilateral trade integration and is calculated as a comparison between interregional and intraregional trade flows (intraregional flows by analogy to perfect integration). The formulation of the phi-ness is derived from the special form of the theoretical gravity equation such that it no longer contains any frictional components of theoretical gravity equation, in particular, the "multilateral trade resistance" term (Anderson and van Wincoop, 2003), giving rise to the name "frictionless" gravity.

extent to which improved conditions of foreign market access can shape export performance of the ASEAN countries. In particular, the structural export equation (Redding and Venables, 2003) postulates that aside from the capacity in supplying goods, locations with good market access tend to perform well in their exports compared to other locations. I, therefore, look at the sensitivity of exports with respect to variations in market access. We shall see that the positive relationship implies the prospects of export performance as a result of deepening integration (i.e., increasing linkages to consumer markets). Nonetheless, it is important to stress that the effects of NEG and comparative advantage theory are not mutually exclusive, providing that it makes sense for us to look also at the role of other export determinants such as wages, labor supply, FDI, and export environment.

In terms of dataset, the analysis in this chapter makes use of industry-level trade data in measuring trade costs and to construct the measure of market access index. Up to now, there has been empirical evidence providing a positive relationship between export performance and market access across countries (Redding and Venables, 2003; Fugazza, 2004). It would thus be of interest to test for the relevance of this relationship at more disaggregated level. Given the data availability, I look at manufacturing exports of the principal ASEAN countries that are consisting of Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam, in 22 industries evaluated at 2-digit level of ISIC Rev. 3 within the period 1990-2010.

Another advantage of using disaggregated data is that it allows us to account for cross-industry heterogeneity in terms of substitutability between goods varieties. This heterogeneity yields several consequences on trade costs and export performance. If goods varieties are not so differentiated, that is to say, domestic and imported varieties are highly substitutable, consumers will show strong demand for diversity and hence will be less sensitive to price variation associated with trade costs on imported varieties. As a result, trade in this category of goods will not be affected much by a small variation in trade costs, whereas the consequence for the exporters is that strong demand for diversity will drive locations with good market access to export more compared with locations with poor market access. Moreover, using industry-level data allows us to examine how characteristics of manufacturing goods can affect the level of trade costs. For instance, goods that have high trade costs are difficult

to transport between distant destinations (i.e., low transportability in terms of weight to value or goods that are heavy and low-valued) or are perishable goods which are sensitive to timeliness of trade.

Chapter 3: Regional Integration and Inequality in per Capita Income

Falling transport costs, although can be favorable to producers and consumers as a whole, may be at the origin of a growing divergence between countries. One of the most apparent divergences is vast income disparities between the richer and the poorer members which also reflect divergent productivity levels. Per capita income figures provided in Table 1.1 reveal that Singapore is about 78 and 52 times richer than Myanmar and Cambodia, respectively. This inequality is also confirmed by the high Gini index for per capita GDPs, which amounted to 70% where zero corresponds to perfect equality (UNESCAP, 2010). This regional inequality is relatively high compared with other regional integration groups, being for instance equal to 30% for the EU [6], or 36% for NAFTA and 28% for MERCOSUR [7].

When relating income level to density of industrial activities as indicated by column (7) in Table 1.1 [8], the distribution of income across ASEAN displays a core-periphery pattern, i.e., countries with the higher per capita income are located at the economic center (Singapore, Brunei Darussalam, Malaysia, and Thailand) and those with lower per capita income are predominantly located at the economic periphery (Myanmar, Cambodia, Lao PDR).

Moreover, looking at the evolutions of GDP per capita during the past two decades, Figure 1.1 illustrates that although every country has experienced income growth and some countries have even started to catch up rapidly (Malaysia and Vietnam), income disparities remain persistent. In fact, income gaps have not narrowed much since ASEAN has started to open up to regional trade in the 1990s.

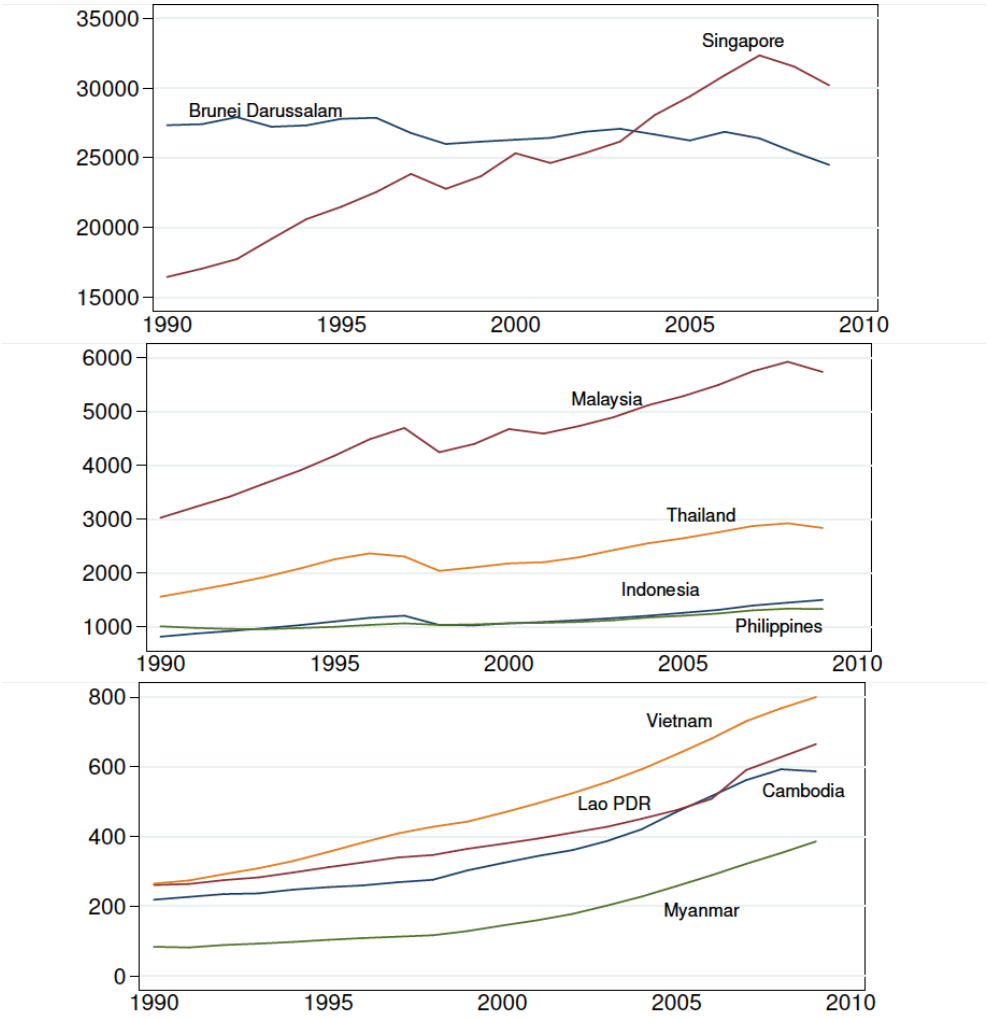
6. Extracted from Eurostat database on living conditions and welfare (2010)
7. Source: Blizkovsky (2012)
8. Industrial activities are measured as real industry value-added per capita with industry sector including construction, manufacturing, mining and utility industries.

Table 1.1 – ASEAN's Basic and Development Indicators (2009)

Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Area	Population	Pop. Density	GDPC	Industrial value-added			Telephone lines	Road density	Rail density
	(km^2)	($\times 10^6$)	(rank)	(USD)	($\times 10^6$ USD)	% ASEAN	per capita	($/10^3$ persons)	($/10^3$ km^2)	($/10^3$ km^2)
Brunei	5,765	0.41	9	24,500	6,384	1.3	15,571	195	693	-
Cambodia	181,035	14.96	8	587	2,146	0.4	143	4	217	3.7
Indonesia	1,860,360	231.37	5	1,498	164,272	34.2	710	147	242	1.9
Lao PDR	236,800	6.128	10	665	986	0.2	161	16	152	-
Malaysia	330,252	28.31	7	5,735	75,061	15.6	2,651	160	300	5.1
Myanmar	676,577	59.53	6	386	4,933	1.0	83	9	41	5.1
Philippines	300,000	92.23	2	1,329	44,330	9.2	481	74	671	1.6
Singapore	710	4.99	1	30,199	54,413	11.3	10,904	387	4,750	-
Thailand	513,120	66.9	4	2,836	95,715	19.9	1,431	108	352	8.7
Vietnam	331,051	86.03	3	800	31,710	6.6	369	203	274	7.6
ASEAN	4,435,670	590.84	-	1,996.17	480,020	100.0	812	123	516	4.0
CLMV	1,425,463	167	-	628.03	39,775	8.3	239	109	258	4.7
ASEAN6	3,010,207	424	-	2,533.66	440,245	91.7	1,038	128	638	3.7

Source: Author's assembly or own calculations from Secretariat (2010) and UNESCAP's database. Values are expressed in U.S. dollars in 2005

Figure 1.1 – Income Convergence in ASEAN: GDP per Capita, 1990-2009 (USD, 2005=100)



Source: Author's calculations based on ESCAP's database.

The analysis in Chapter 3 addresses this undesirable but likely impact of the integration by investigating the relevance of the structural wage equation in explaining cross-country economic development in ASEAN. Empirical methodology in this chapter follows that of Redding and Venables (2004a) where the approximation of the logarithm of wages at country level is given by the logarithm of the GDP per capita in each country. The central variable in the analysis is once again the market access; high values of market access lead to high wages, which reflects the agglomeration mechanisms linked to the size of final markets.

I construct market access index for each ASEAN country and for the period between 1990-2010 using estimates obtained from gravity model of ASEAN manufacturing trade. Unlike Chapter 2, bilateral trade data employed here are aggregates of the entire manufacturing sector so that I am able to account for all the ASEAN countries in the dataset. Moreover, just like in Bosker and Garretsen (2012), my gravity equation explicitly includes observable country-specific variables instead of introducing country-fixed effect dummies which is the common practice in the literature (Anderson and van Wincoop, 2003; Baldwin and Taglioni, 2006). Thus, I am able to use the estimated coefficients to calculate market access index even when trade data are not available for some countries, especially for the lower-income members where the data are relatively sparse.

Lastly, estimating the wage equation calls for a certain number of control variables against potential omitted variable problem, especially when theoretical prediction made a strong assumption that the technological level and factor prices for other mobile production factors (e.g. intermediate inputs) are the same across locations (Combes *et al.*, 2008, Chapter 12). To this end, I follow the literature in including country-fixed and time-invariant fixed effects as well as explicitly controlling for the quality of labor force (e.g. gross enrollment in tertiary education and female labor force) in the robustness regressions (Amiti and Cameron, 2007; Head and Mayer, 2011).

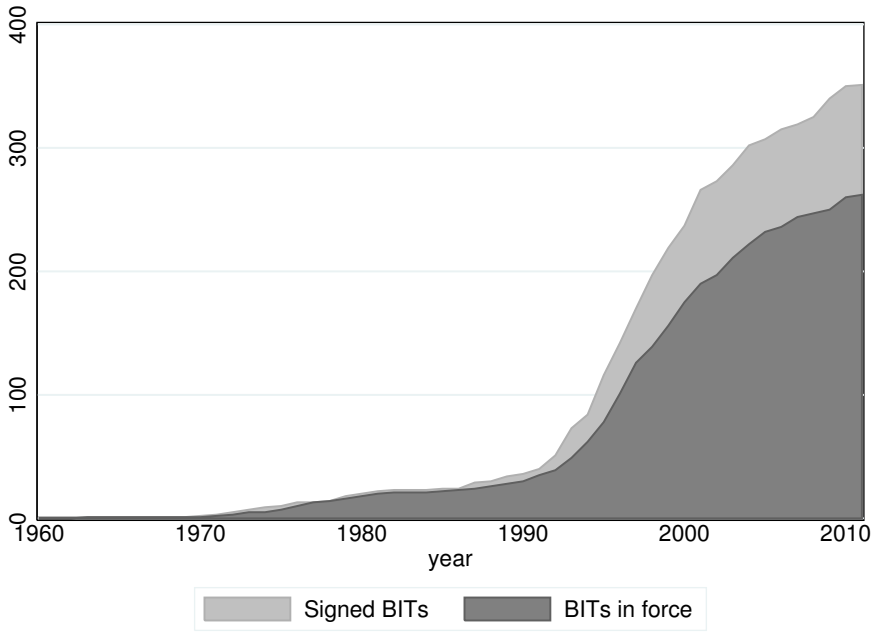
In the last section of the chapter, I exploit estimation results of the wage equation to conduct some simple and fictive experiments for policy implication; in particular, I show how an exogenous policy shock to drive up market access can affect spatial income adjustment of the ASEAN countries. This exercise can be helpful in simulating results of implementing policy measures towards prevention/diminution of the likely widening disparities and ensuring equitable economic development as the integration deepens.

Chapter 4: Investment Liberalization and FDI Attractiveness: The Role of Bilateral Investment Treaties

The last empirical chapter investigates the impact of investment liberalization in ASEAN with particular focus on the role of implementing bilateral investment treaties (BITs) in attracting inflows of FDI. This analysis is moti-

vated by a growing number of BITs engaged by the ASEAN countries which surged in the last two decades to amounted to 351 in 2011 (cf. Figure 1.2 which is taken from Section 4.3). Moreover, the research agenda on quantitative impact of BITs which is still quite recent [9] and there is yet no general consensus whether BITs really promote FDI into the signatory host countries, many of which are developing countries. Therefore, the study of the ASEAN case in this chapter can have a general contribution to fill in this gap. Moreover, I also distinguish between the effects of implementing BITs with the developed and developing home countries.

Figure 1.2 – Cumulated Number of BITs in ASEAN, 1960-2011



Source: Author's calculation from UNCTAD's BITs database.

Using a dataset on bilateral FDI stocks into the ten ASEAN countries between 1990-2007 from 50 source countries (including 27 developing countries), the empirical workhorse of this chapter is the gravity model for FDI inspired from Kleinert and Toubal (2010). It includes some features that are common to those of the trade gravity model, e.g., GDPs and some forms of frictions that impede investment flows. Kleinert and Toubal proposes the structural gravity equation derived from two different classes of trade models with multinational

9. Among the first contributions are such as Hallward-Driemeier (2003); Egger and Pfaffermayr (2004); Neumayer and Spess (2005) and Tobin and Rose-Ackerman (2005).

firms, i.e., the proximity-concentration model (Brainard, 1997; Helpman *et al.*, 2004) and the factor-proportion model (Venables, 1999b), allowing us to differentiate between horizontal and vertical nature of FDI.

I consider two types of investment barriers in the FDI gravity that are the quality of domestic institutions and control on capital account. BITs are expected to directly and indirectly increase FDI. Especially, the indirect impact postulates that BITs are expected to mitigate these barriers by acting as substitutes for a sound investment climate to attract foreign investment. I investigate these issues with the help of one of the recent estimation methods applied to the gravity to account for the presence of many zero-valued FDI in my dataset (Silva and Tenreyro, 2006; Desbordes and Vicard, 2009; Kleinert and Toubal, 2010).

Finally, general results provided by the three empirical studies bring us to conclude that, to a large extent, the process of ASEAN trade and investment integration meets with the predictions of the NEG models that locations with good market access are attractive for exports; production factor prices are high in locations with good market access; and the extent of cross-border investment between countries decreases in their trade distance. The evidence provided by Chapters 2 and 3 suggests that improved proximity to markets represents a benefit to the growth of ASEAN's manufacturing exports although deepening integration potentially leads to economic imbalances between countries. The bottom line is that, as markets are becoming spatially related through growing integration, economic dynamism of the partner countries, both intra- and inter-regional, can exert influence on ASEAN's own trade and economic performance. Meanwhile, the gravity relationship in Chapter 4 suggests that FDI attractiveness depends also on the host country's business environment, such as domestic institutions and capital openness. Implementing a measure to liberalize investment barriers through, for instance, bilateral investment treaties (BITs) proves to be efficient in promoting inflows of FDI in the ASEAN context.

Major Agreements and Achievements in ASEAN Economic Integration

Year	Agreement/Achievement	Description
1967	Bangkok Declaration	Creation of ASEAN by Indonesia, Malaysia, Philippines, Singapore, and Thailand.
1977	Agreements on ASEAN preferential trading agreements	Applying preferential tariff rates on a margin of preferences over MFN on intra-regional trade.
1987	Investment Guarantee Agreement–IGA	Protection of intra-regional FDI with provisions for compensation in case of expropriation, guarantees of an investor's right to repatriate earnings, and dispute settlement.
1992	Creation of ASEAN Free Trade Area–AFTA	Implementing a Common Effective Preferential Tariff (CEPT) scheme where 99 percent of product categories will have intra-ASEAn tariff rates reduced to 0-5 percent.
1995	ASEAN Framework Agreement on Services–AFAS	Eliminating barriers to trade in services, enhance intra-ASEAN services cooperations, and liberalize service trade.
1996	ASEAN Industrial Cooperation Scheme–AICO	Promotion of joint manufacturing industrial activities between the ASEAN-based companies (ASEAN and non-ASEAN) where the AICO products can take the benefit from the CEPT scheme
1996	ASEAN Vision 2020	Commitment to create a stable, prosperous and highly competitive region in which there is a free flow of goods, services and investments, a freer flow of capital, equitable economic development and reduced poverty and socio-economic disparities.
1997	Framework Agreement on the ASEAN Investment Area–AIA	Promoting free flow of investment (in the sectors of manufacturing, fisheries, forestry, mining, agriculture, and services) by 2020, or by 2015 for the ASEAN investors. Reservations in manufactures have been eliminated by the ASEAN-6 countries (the founding members and Brunei) since 2003 for the ASEAN investors and since 2010 for all investors.
1998	Hanoi Plan of Action	The first series of action plans to help implement the ASEAN Vision 2020 (for the period 1999-2004)

Year	Agreement/Achievement	Objective
2000	Initiative on ASEAN Integration (IAI)	Addressing the developing gap between member states through soft infrastructure projects (e.g., training, technical studies, and capacity building) and hard infrastructure projects (e.g. transportation, communication).
2003	Declaration of ASEAN Concord II (or Bali Concord)	(i) Adopting the goal to establish an ASEAN Community by 2020 that consists of three integration pillars (or communities), namely, political and security cooperation, economic cooperation, and sociocultural cooperation. The ASEAN Economic Community (AEC) is the end goal of the economic integration stipulated in the ASEAN Vision; (ii) Identifying Eleven Priority Integration Sectors.
2004	Vientiane Action Program	Succeeding to the Hanoi Plan of Action to cover the period 2004-2010.
	ASEAN Framework Agreement for the Integration of Priority Sectors	Providing roadmaps for each priority sector that identify measures to be implemented and timeliness for their implementation.
2005	ASEAN Single Window Agreement–ASW	Implementing the measures of simplifying, harmonizing and standardizing intra-regional trade customs, such as, by allowing a single submission of data and information on customs clearance of cargo.
2007	ASEAN Community by 2015	Leaders at the 12th ASEAN Summit in Cebu, the Philippines, agreed to set the new timeline to establish the ASEAN Community by 2015 as well as the AEC.
	AEC Blueprint	Leaders at the 13th ASEAN Summit in Singapore adopted the AEC Blueprint which provides the framework for achieving the AEC by 2015.
2008	ASEAN Charter	Implementing the ASEAN Charter which is the legal and institutional framework for ASEAN.
2009	ASEAN Comprehensive Investment Agreement–ACIA	Complement to the AIA by including comprehensive provisions on investment liberalization, extending the benefits to foreign-owned ASEAN-based investors. However, each member state still has their own exclusion list.
	Roadmap for the ASEAN Community, 2009-2015	Replacing the Vientiane Action Program and consisting of the Economic Community Blueprint, the Socio-Cultural Community Blueprint, and the Second IAI Work Plan.

Year	Agreement/Achievement	Objective
2010	ASEAN Trade in Goods Agreement–ATIGA	Achieving the free flow of goods to establish a single market and production base of the AEC with consolidation of existing initiative related to trade in goods (e.g., CEPT-AFTA, non-tariff measures, ASEAN Single Window, Priority Integration Sectors, etc).
	Master Plan on ASEAN Connectivity–MPAC	Enhancing development of physical infrastructure, institutional connectivity and people connectivity

Source: Compiled from ASEAN Secretariat's documents and the report by the USITC (US International Trade Commission)

Chapter 2

Trade Integration and Export Performance in Manufactures

Abstract

The objective of this chapter is to assess the integration progress in reducing manufacturing trade costs of the principal ASEAN countries, namely, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. In addition, I examine the sources of declining trade costs and investigate how the integration can shape the countries' export performance. Using industry-level export and output data in 22 manufacturing industries between 1990-2010, I find that the integration progress differs across the ASEAN countries and depends on industry characteristics such as the degree of product differentiation and goods transportability. Moreover, the quality of international and domestic transportation, which are proxied respectively by bilateral and domestic distances, as well as customs timeliness are substantial in defining manufacturing trade integration of the countries. Finally, cross-industry and cross-country results reveal the export-stimulating effect arising from increasing proximity to foreign markets, as measured by external market access. I also find the role of manufacturing wage, labor supply, and competitive export environment to be important. Such result highlights a role for the mutual effect exerted by economic geography and countries' comparative advantage in defining manufacturing export performance of these ASEAN countries.

2.1 Introduction

The dynamic of ASEAN integration has been driven by trade in manufactures, sharing about 90% of the region's total merchandise exports in 2010 compared with 80% on average for the low- and middle-income countries.[1] Another source of the dynamism is the dependence on foreign markets for the exports which is partly explained by the region's active participation in global production network as suppliers of parts and components and as assemblers of final goods. Given the strategic importance of manufacturing trade, accelerating integration in manufacturing sectors has been one of the priorities for the establishment of the ASEAN Economic Community (AEC). To this end, twelve priority economic sectors have been identified where nine involve merchandise exports and about 75% of these alone cover manufactures of electronics, information, and computing products (Wattanapruttipaisan, 2008).

It is expected that lowering trade costs, defined broadly to involve components such as tariff and non-tariff barriers (NTBs) (Anderson and van Wincoop, 2004), will improve countries' access conditions to foreign markets, increasing intra- and inter-regional linkages, thereby sustaining ASEAN's export competitiveness. A number of questions can arise regarding the progress and the benefit from the integration: Has the ASEAN integration been successful in effectively lowering trade costs for manufacturing goods in the past decades?; What are the sources of declining trade costs?; How important is the integration in shaping manufacturing export performance of the ASEAN countries and how important is this impact compared with the countries' comparative advantage in exports?

Providing answers to these questions, the objective of this chapter is therefore threefold. It consists of evaluating the progress of ASEAN integration in reducing intra- and inter-regional trade costs for manufacturing goods, examining their driving force for policy implication in promoting manufacturing trade integration, and investigating potential benefit of the integration in terms of improved export performance. My work therefore relies on the one hand, on the strategy of measuring trade costs and investigate the relevance of this measure with the actual trade barriers, and on the other hand, on the investigation of impact of foreign market access on manufacturing exports of the ASEAN

1. My own calculation based on UN Comtrade data, downloaded from WITS.

countries. Given data availability, the analysis covers principal manufacturing exporters in ASEAN, namely, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam (henceforth the ASEAN-6), in 22 manufacturing industries evaluated at 2-digit level of ISIC Rev. 3 between 1990-2010.

For the purpose of evaluating trade integration, l calculate the level of trade costs indirectly from bilateral trade data and use it as indicator reflecting the integration degree. In particular, I chose the Novy index as a measure of bilateral trade costs (Novy, 2009), which is built on the line of work such as Head and Ries (2001); Baldwin *et al.* (2003) and Head and Mayer (2004) that are known to be data parsimonious, yet capable of capturing the entire set of existing costs related to trade. I could have used direct observations on trade cost components, such as, the difference between the cost- insurance-and-freight (c.i.f.) importer price and the free-on-board (f.o.b.) exporter price to capture transport costs. [2] The measures of tariffs and non-tariff barriers could have been applied also to capture trade policy barriers, especially since the ASEAN Secretariat has recently made the publication of NTBs database available [3]. However, the issues such as missing data and incompatible methods of calculation across countries, particularly for the NTBs components, have limited this direct measurement in my analysis. As a result, the direct measurement has a disadvantage of being unable to provide a comparable and consistent trade integration measures across countries, industries, and years which I need in this chapter. Using the indirect trade cost measurement here, I believe that my work joins some of a few and recent attempts to provide a clear quantitative assessment of trade costs involving the ASEAN countries at commodity or industry levels. [4]

Moving on to the econometric analysis investigating the relationship between trade integration and export performance, my empirical workhorse is Redding and Venables' export equation developed from the gravity equation of Krugman-inspired model (Redding and Venables, 2003, 2004b). The equation places a relationship between a country's export and two types of determinants

2. See the pioneer works of Harrigan (1993); Hummels (1999); Baier and Bergstrand (2001) and Limao and Venables (2001). Further applications such as Sourdin and Pomfret (2009) and Hamanaka and Domingo (2012) have applied this approach to include the ASEAN countries.

3. http://www.asean.org/news/item/non-tariff-measures-database (accessed May 2013)

4. See existing works such as Okabe (2012) and Shepherd (2010a) where the latter author has also applied the Novy index in his analysis.

that are internal and external to the exporting country. On the one hand, the internal determinant includes any improvement in supply-capacity conditions associated with exporter's comparative advantage or variables related to location and policy that may influence competitive export environment such as, country size, technology, economic policy, development level, and domestic institutions. On the other hand, the external determinant involves a country's proximity to consumers, which shape the conditions of foreign market access for the exporter.

While the role of internal supply capacity on export performance is straightforward and can be explained by the class of trade models in comparative advantage, economic geography theory additionally investigates the contribution of foreign market access such that export opportunities generated by rising foreign demand are higher between locations that are at close proximity (or well integrated) than elsewhere. Hence, deepening integration with partner countries improves countries' foreign market access, thereby contributing to the increase of their manufacturing exports.

To shed light on results of existing empirical works that follow the pioneer studies of Redding and Venables (2003, 2004b), they successfully prove the mechanism of foreign market access at work [5], where supply-side capacity variables are also found to be mutually significant. Fugazza (2004) finds that the effect of foreign market access is increasing with export levels. He also finds the internal factors like GDP, population, and institutional and macroeconomic variables to play significant role. Naudé and Gries (2009) also confirm that market access matters for manufacturing exports of well-performing locations across magisterial districts in South Africa even after accounting for other internal factors such as fixed costs and institutions. Shepherd (2010b) finds that improved market access also increases trade with new partners, i.e., trade would expand at geographical extensive margin, while also suggesting important role of trade facilitation in improving market access.

The analysis in this chapter differs from the above by applying the framework to industry-level data to account for sectoral specificity that may influence the impact of foreign market access. In addition, unlike Redding and

5. In a cross-sectional dataset of 101 countries between 1990-1997, they find that countries with high export growth, e.g., Japan, Malaysia, and Singapore, see their foreign market access increases twice as much as foreign market access growth in countries with low export performance which are mostly located in Sub-Saharan Africa.

Venables, my measure of market access is industry-specific, and is constructed from observable data instead of using the trade-gravity estimation approach. In particular, the two components of market access which are bilateral trade costs and demand levels of the partner countries are approximated respectively by the Novy index and the countries' apparent consumption.

The structure of the remaining part of the chapter is the following. Section 2.2 addresses theoretical motivations of my empirical analysis dealing with the measure of industry-specific trade costs, an empirical specification to investigate their driving force, and the Redding and Venables (2003)'s export equation to examine the impact of foreign market access. Section 2.3 presents required data before proceeding to the presentation of our results in Section 2.4 and Section 2.5. Section 2.6 concludes our findings and provide some implication on integration policy.

2.2 Theoretical Motivation

In this section, I motivate the empirical investigation of the chapter by relating my analytical framework to the Dixit-Stiglitz-Krugman trade model in monopolistic competition (Dixit and Stiglitz, 1977; Krugman, 1980). In the following, I will present one of the common methods in NEG empirical literature to measure bilateral trade costs which will be applied to my study and show how econometric analysis can be conducted on the obtained measure to investigate their driving force. This trade cost measure will also be used to construct the foreign market access index which is required in the second economic analysis on export performance.

2.2.1 Industry-Specific Measure of Bilateral Trade Costs as Indicator of Trade Integration

To measure bilateral trade costs, I use the Novy index (Novy, 2009) which is derived from the gravity of the Dixit-Stiglitz-Krugman model and can be extended to industry-level analysis (see Anderson and van Wincoop (2003)).

The framework is a partial equilibrium model in multi-country and multi-industry goods markets. Denote x_{ij}^s as nominal exports from country i to country j in industry-s goods. The quantity of goods s demanded by consumers

in country j, q_{ij}^s, is defined by maximizing their utility over horizontally differentiated product varieties, consumed as final and intermediate goods, with a constant intra-sectoral elasticity of substitution, $\sigma^s \geq 1$. In addition, each variety is produced by one firm located in exporting country i where, in equilibrium, the number of goods-s varieties available in this country would equal to the number of firms operated there, n_i^s. Since shipment of goods s between countries incurs some costs τ_{ij}^s, modeled as the iceberg type (Samuelson, 1952) or *ad valorem* tax equivalent of the factory gate price in the exporting country, denoted by p_i^s, the price faced by country-j consumers can be expressed as $p_{ij}^s = \tau_{ij}^s p_i^s$ where $\tau_{ij}^s \geq 1$.

In equilibrium, the value of bilateral export industry s is a product of demanded quantity for all the goods-s varieties and their respective prices. This can be expressed by the following trade gravity equation:

$$\begin{aligned} x_{ij}^s &= n_i^s p_{ij}^s q_{ij}^s \\ x_{ij}^s &= n_i^s (p_i^s)^{1-\sigma^s} (\tau_{ij}^s)^{1-\sigma^s} (P_j^s)^{\sigma^s - 1} Y_j^s \,, \end{aligned} \tag{2.1}$$

where $P_j^s \equiv \left[\sum_i n_i^s (p_{ij}^s)^{(1-\sigma^s)}\right]^{\frac{1}{1-\sigma^s}}$ is the CES-price index of the partner country. The Eq. 2.1 will be served to measure trade costs indirectly, where one of the standard practices adopted by empirical NEG models is to quantify the overall degree of market segmentation, i.e., measuring the difference between actual trade flows and those that are predicted if integration were perfect (Head and Ries, 2001; Head and Mayer, 2004). This can be quantified by the ratio between the international trade flows, x_{ij}^s and x_{ji}^s, and domestic trade flows, x_{ii}^s and x_{jj}^s, in both directions. Replacing the flows by their respective expressions based on the Eq. (2.1) before taking the geometric mean of the ratio, and rearrange the degree of product differentiation, we finally obtain the Novy's index, T_{ij}^s, such that:

$$T_{ij}^s \equiv \left(\frac{\tau_{ij}^s \tau_{ji}^s}{\tau_{ii}^s \tau_{jj}^s}\right)^{\frac{1}{2}} = \left(\frac{x_{ii}^s x_{jj}^s}{x_{ij}^s x_{ji}^s}\right)^{\frac{1}{2(\sigma^s - 1)}} \,, \tag{2.2}$$

which can be expressed in tariff-equivalent trade cost as:

$$T_{ij}^s = \left(\frac{x_{ii}^s x_{jj}^s}{x_{ij}^s x_{ji}^s}\right)^{\frac{1}{2(\sigma^s - 1)}} - 1 \,. \tag{2.3}$$

There are several advantages in using this measure. First, its calculation requires a small set of data: only data on bilateral trade and internal flows for the sector in question are needed. Second, the measure captures a full set of trade costs components, some of which we usually have limited observable data. This is the reason why the tariff-equivalent trade costs obtained from this index should be interpreted as the possible upper-bound tariff rate since the measure does not capture only the actual tariff component of trade costs. Third, since the Novy index is constructed as a ratio of trade flows, its application is not restricted to a monopolistic competition trade model as in our case but can be generalized to any classes of trade frameworks (see Novy (2009) for further demonstration).

Finally, the measure takes into account the cross-industry heterogeneity in terms of the elasticity of substitution σ^s between intra-sectoral varieties which crucially influences the level of trade costs. As Eq. (2.2) shows, a higher elasticity of substitution would imply *lower* trade costs. Intuitively, this means that, if the good-s varieties are becomingly less differentiated, (i.e., $\sigma^s \to \infty$), consumers will tend to be sensitive to price in a way that, all else being equal, a small price variation induced by international trade can hamper imported varieties in favor of domestic one and thus, leads to a high ratio of domestic over international trade.

2.2.2 Estimated Specifications of Bilateral Trade Integration

Next, I turn to the econometric analysis of the determinants of bilateral trade integration. This is based on the estimation of the Novy index expressed in terms of the components of trade costs. Therefore, we need to specify *a priori* the functional form of bilateral trade costs where I focus on components that are common in the gravity literature (Anderson and van Wincoop, 2004; Combes *et al.*, 2008). As a proxy for transportation costs, I consider a set of physical geography, historical, and cultural variables, such as, contiguity, common language, and colonial tie. These variables are contained in the vector GEO_{ij}. I also account for a range of policy-related trade costs that are membership in a bilateral/regional trade agreement RTA_{ij}, cross-industry bilateral tariff measures tar^s_{ij}, and different facets of trade facilitation FAC_{ij}. These

factors enter trade cost function in multiplicative form (hence, all the dummy variables are in the exponential term) such as:

$$\tau_{ij}^{s} = (1 + tar_{ij}^{s}) FAC_{ij} d_{ij}^{\beta^s} \exp\left(\delta^s GEO_{ij} + \eta^s RTA_{ij} + \epsilon_{ij}^{s}\right) , \qquad (2.4)$$

where d_{ij} is a physical distance separating a pair of trading countries. Remaining determinants of trade costs are captured in ϵ_{ij} which is assumed to be an independent, zero-mean residual term. Replacing Eq. (2.4) in (2.2) and log-linearizing yields the estimated specification of the bilateral trade cost measure in cross-country and cross-industry model:

$$\begin{aligned} ln(T_{ij,t}^{s}) = \alpha_0 + \alpha_s + \alpha_t + \beta_1 ln d_{ij} + \beta_2 ln\left(\sqrt{d_{ii} \times d_{jj}}\right) + \delta GEO_{ij} - \eta RTA_{ij,t} \\ + \gamma_1 ln\left(\sqrt{(1 + tar_{ij,t}^{s})(1 + tar_{ji,t}^{s})}\right) + \gamma_2 ln\left(\sqrt{FAC_{ij,t} \times FAC_{ji,t}}\right) + \varepsilon_{ij,t} , \end{aligned} \qquad (2.5)$$

with $\varepsilon_{ij,t} = \frac{1}{2}(\epsilon_{ij,t} + \epsilon_{ji,t})$, α_t and α_s being the time-fixed and sector-fixed effects, respectively. The country-pair fixed effects are captured by geographical variables which only vary across a couple of trading partners.

I expect that bilateral trade costs would increase with distance and tariffs but reduce with the membership in an RTA, the quality of trade facilitation, and sharing a common geographical/historic-cultural features. Therefore, we await the following signs of these coefficients to be true: $\hat{\beta}_1 > 0$, $\hat{\beta}_2 < 0$, $\hat{\eta} < 0$, $\hat{\gamma}_1 > 0$, $\hat{\gamma}_2 < 0$, $\hat{\delta} < 0$.

2.2.3 Composition of Export Performance: Supply Capacity vs. Market Access

After having evaluated the progress of the integration in reducing trade costs across industries and investigated their driving forces, the last econometric analysis consists in examining the potential benefits that the ASEAN countries may gain from the integration in terms of export performance. This analysis is based on the estimation of the Redding and Venables (2003)'s export equation which can be derived for each industry s from the gravity equation (2.1). By

summing across all import destinations j, the structural export equation is:

$$X_i^s \equiv \sum_{j \neq i} x_{ij}^s = n_i^s (p_i^s)^{1-\sigma^s} \sum_{j \neq i} (\tau_{ij}^s)^{1-\sigma^s} (P_j^s)^{\sigma^s - 1} Y_j^s \,, \tag{2.6}$$

where the authors define the exporters-specific term $sc_i^s \equiv n_i^s (p_i^s)^{1-\sigma^s}$ as the internal supply capacity and the importer-specific term $mc_j^s \equiv (P_j^s)^{\sigma^s - 1} Y_j^s$ as the market capacity of each importer. Denoting

$$FMA_i^s \equiv \sum_{j \neq i} (\tau_{ij}^s)^{1-\sigma^s} mc_j^s \tag{2.7}$$

as the foreign market access, the export equation boils down to:

$$X_i^s = sc_i^s FMA_i^s \,, \tag{2.8}$$

where the log of the Eq. (2.8) gives the estimated equation of the export performance expressed in terms of internal supply-capacity component ($supply_i^s$) and the external market access component (FMA_i^s):

$$lnX_i^s = \lambda_0 + \ln supply_i^s + \ln FMA_i^s + \mu_i^s \tag{2.9}$$

with μ_i^s being the error term. This equation exploits the relationship between manufacturing export performance and the mutual effect of comparative advantage and foreign market access. In particular, FMA_i^s embeds the effect of bilateral integration which increases the proximity to all partner countries, which is the term we are interested in. Therefore we expect the export-stimulating effect of the integration if the estimation of Eq. (2.9) reveals a positive and significant coefficient on FMA_i^s.

2.3 Data and Variable Construction

There are two datasets required in this chapter. The first contains data on variables that are used in constructing the Novy index T_{ij}^s as well as various determinants of bilateral trade costs. The second contains data on variables that will be used in the analysis of export performance including the FMA_i^s index.

2.3.1 Trade Flows and Components of Trade Costs

Bilateral exports, x_{ij}^s and x_{ji}^s, are observed between a pair of ASEAN country i and its partner j in industry s. Missing bilateral exports between i and j are replaced by mirror data, i.e., bilateral imports by the partner country j from the exporter i [6]. Domestic trade flows for an ASEAN country, x_{ii}^s, and for the partner country x_{jj}^s, are measured for each industry as the difference between a country's output and total export values, assuming that a country produces goods for its own and foreign consumptions (Wei, 1996; Head and Mayer, 2000) [7].

All trade flows are measured at two-digit level of ISIC Rev. 3, ranging from Food and beverage industry (ISIC 15) to Furniture (ISIC 36). These data come from UN-Comtrade database. Output data are measured at the same aggregation level and come from UNIDO's INDSTAT database. The final trade dataset covers the period from 1990-2010 and 59 intra- and inter-regional partner countries who accounted altogether around 95% of trade in manufactures with ASEAN region during the studied period. Lists of countries and industries in the dataset are provided in Appendices 2.A.2.

Components of trade costs include geography variables as well as the measures of trade policies and trade facilitation. Bilateral distance and other historic-cultural features come from CEPII. Membership in a common trade agreement is a dummy variable, $RTA_{ij,t}$, constructing from the list of regional trade agreements that are extracted from WTO's RTA database. Bilateral tariffs are industry-specific, tar_{ij}^s, measured at 2-digit level of ISIC Rev. 3 as a trade-weighted average of applied tariffs levied on imports (in percentage). The data come from UNCTAD's TRAINS database [8].

In addition, these variables are trade facilitation measures which involve a set of policies aimed at removing non-tariff trade barriers. The measures are

6. Although using mirror data can raise the issue of trade discrepancy due to, for example, the difference in the evaluations of f.o.b. export and c.i.f. import prices, using this approach allowed me to gain about 10% of the observations in the final dataset. See Hummels and Lugovskyy (2006) and Guo (2009) for further discussions on trade discrepancy issue.

7. Calculating domestic trade flows was challenged by missing output data in some years. Statistically, any missing data can be consistently replaced with substitute values obtained from imputation techniques. The method that has been applied in this chapter is based on a combination of linear interpolation and time trend regressions. See, for example, Boudt *et al.* (2009) for the methodology in more detail.

8. Download from the WITS, accessed February 2012.

mostly related to simplification of customs procedures and transport infrastructure. Data on trade facilitation are assembled from two recent sources. The first is World Bank's Doing Business database which provides indicators related to customs administration of cross-border exports and imports. The indicators are total official costs to import/export (excluding any tariff-related costs) $Cost_{ij}$, the number of documents Doc_{ij} and time expressed as counted days $Time_{ij}$ required for import/export.

The second dataset of trade facilitation comes from the "Trade Section" of World Economic Forum's Global Competitiveness Report which looks at the aspects related to customs transparency and infrastructure. The indicators obtained from this source are undocumented payments or bribes connected with imports and exports, $Payment_{ij}$, and infrastructure qualities related to facilities on maritime ports, $Port_{ij}$, and airports, Air_{ij}. These indicators are constructed basing on responses to survey questions in which executives of both home and foreign firms are asked to provide the scores on the quality of the measures in question.

A more detailed description of trade cost components, the exact definition of trade facilitation measures as well as the construction of these variables are provided in Table 2.10 in Appendices.

2.3.2 Elasticities of Substitution

The assumptions on the elasticities of substitutions σ^s, which are unknown parameters here, are crucial in determining the true value of bilateral trade cost measure. The elasticities can be estimated by various methods (see discussion in Anderson and van Wincoop (2004, pp. 715-16)). One of them is to exploit information about directly observable industry-specific trade barriers such as tariffs and/or freight costs. The estimated value of σ^s is then calculated from tariff coefficient obtained from estimating a theoretical trade gravity equation in fixed effects [9]. This is the approach adopted here where I assume that distance,

9. See for example Harrigan (1993); Head and Ries (2001) and Baier and Bergstrand (2001) who applied this methodology at different aggregation levels. Harrigan (1993) implicitly models the impact on full trade costs of directly observed trade costs that are tariffs and freights for 13 OECD countries across 28 sectors. Head and Ries (2001) fit the bilateral gravity equation to the three-digit industry data in the U.S. and Canada from 1990 to 1995. Baier and Bergstrand (2001) apply it to aggregated trade data for 16 OECD countries from the period 1958-60 to the period 1986-88.

$dist_{ij}$, and *ad valorem* tariff, tar^s_{ij} are principal industry-specific trade costs expressed by the following functional form: $\tau^s_{ij} = (1 + tar^s_{ij})dist^{\delta^s}_{ij}$, with δ^s being distance elasticity. Replacing τ^s_{ij} in the structural gravity equation in Eq. (2.1), I then estimate the following:

$$\ln x^s_{ij} = \alpha^s_0 + FX^s_i + FM^s_j + \alpha^s_1 \ln dist_{ij} + \alpha^s_2 \ln(1 + tar^s_{ij}) + \varepsilon^s_{ij} \ , \qquad (2.10)$$

with α^s_0 being a constant term, FX^s_i exporter-fixed effects (capturing the term $n^s_i(p^s_i)^{1-\sigma^s}$), FM^s_j importer-fixed effects (capturing the term $(P^s_j)^{\sigma^s-1}Y^s_j$), and ε^s_{ij} being the idiosyncratic error term. I expect the coefficients on distance, $\alpha^s_1 \equiv (1-\sigma^s)\delta^s$, and on tariffs, $\alpha^s_2 \equiv 1-\sigma^s$, to be negative, where the estimated elasticity of substitution can be obtained as $\widehat{\sigma^s} = 1 - \widehat{\alpha^s_2}$.

The Eq. (2.10) is estimated in each industry and for intra- and inter-regional trade separately in order to allow for different substitutability between the ASEAN and non-ASEAN product varieties.

2.3.3 Determinants of Export Performance

The second dataset is made up of foreign market access and supply-side variables of the ASEAN-6 countries that will be used to investigate the determinants of manufacturing export performance.

Industry-specific foreign market access of each ASEAN-6 country FMA^s_i is computed for each year from the obtained Novy index such as

$$\widehat{FMA^s_i} = \sum_{j \neq i} (T^s_{ij})^{(1-\hat{\sigma^s})} \left(output^s_j - \sum_k x^s_{jk} + \sum_k x^s_{kj} \right) , \qquad (2.11)$$

where the term in the parenthesis is importer's apparent consumption, i.e., output plus total imports, $\sum_k x^s_{kj}$, net of exports, $\sum_k x^s_{jk}$,which is served as a proxy for his market capacity mc^s_j. Trade and output data required here are the same as those in the previous dataset.

In order to account for industry-specific comparative advantages in factor price and endowment, I include manufacturing unit labor cost, w^s_i, and manufacturing employment, l^s_i. Unit labor cost is measured as total wage and remittance paid to employees in each industry per one unit of production whereas manufacturing employment is measured as a headcount number of paid employees. Both variables are aggregates at 2-digit level of ISIC Rev. 3 and come

from UNIDO's INDSTAT database.

I also consider the competitiveness of export environment which is captured by variables related to institutional and international macroeconomic conditions. Institutional quality is approximated by corruption perception index from the International Country Risk Guide (ICRG) database where the higher value implies lower corruption practice. Macroeconomic conditions are captured by the average annual exchange rate of the national currency against one US dollar, ER_i^s (year 2000=100), where the data are obtained from UN-ESCAP. A positive value would imply a depreciation of the national currency reflecting a gain in international price-competitiveness of the exporter.

Finally, I account for the role of inward foreign direct investment (FDI) which is measured as the contribution in gross fixed capital formation (GFCF) of inward stock of manufacturing FDI in projects with foreign interest, FDI_i^s. Both FDI and GFCF are measured at 2-digit level of ISIC Rev. 3 and come from ASEAN's FDI Database (Statistics of Foreign Direct Investment in ASEAN: the 2nd and 10th editions) and UNIDO's INDSTAT database, respectively.

2.4 Accessing ASEAN's Manufacturing Trade Integration

2.4.1 The Progress in Trade Cost Reduction

Let us investigate how trade liberalization in manufactures has evolved in the past two decades for the ASEAN-6 countries. It would be interesting to examine also the trends across industries, in particular, in the ASEAN's priority manufacturing goods.

Cross-Country Result: Figure 2.1 summarizes the value of the Novy index T_{ij}^s, expressed as *ad valorem* tariff, for each of the ASEAN-6 countries by focusing on the median of the values calculated for the combinations of intra- and inter-regional trade in all of the 22 industries. Regarding intra-regional trade, if we compare the countries' trends with that of Singapore who is considered as the least trade-discriminating in the region, we can say that Malaysia and Thailand have made a significant progress in lowering intra-regional trade costs between 1990-2010 (i.e., by 10% and 26% respectively). The level of intra-

regional trade costs in Vietnam is still the highest compared with Indonesia, Malaysia, Singapore, and the the Philippines but the country has made a significant progress in reducing them (i.e., by 36% in two decades). The integration progress is more moderate in Indonesia and the Philippines where the level of trade costs have only started to fall effectively in the second decade (i.e., by 12% and 4%).

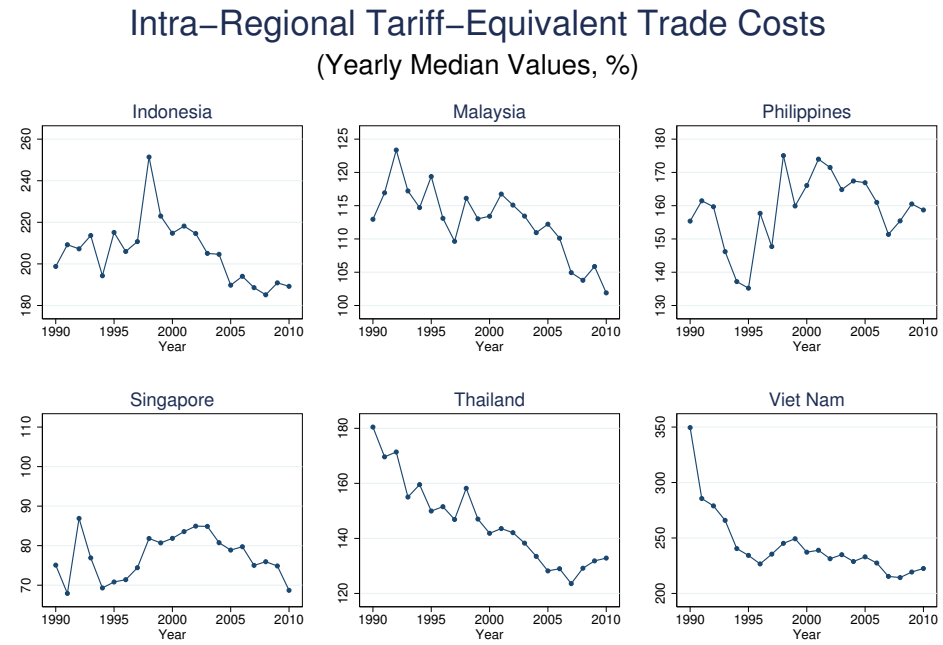
Nonetheless, it should be noted that despite the fact that ASEAN has virtually been considered as a tariff-free zone for intra-regional products, the high value of Novy index obtained in these countries could reflect an important amount of remaining non-tariff barriers (NTBs) to be eliminated. In fact, since the creation of AFTA in 1992, intra-regional tariffs have been brought down to zero under the Common Effective Preferential Tariff Scheme (CEPT). Nowadays, intra-regional tariffs of more than 99% of the products in the CEPT Inclusion List (around 50,000 items) traded by Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, have already been lowered to 0-5 percent tariff range, averaging the rate of 0.05% in 2010. Cambodia, Laos, Myanmar, and Vietnam have also made a significant progress in this direction; the average rate of intra-regional tariff leveled down to 2.47% in 2010, with tariffs of nearly 50% of the products in the CEPT Inclusion List (around 16,000 items) have already been brought down to zero (ASEC, 2012, pp. 31-33).

Moreover, a quick glance at the evolutions for inter-regional tariffs tells us that ASEAN's trade in manufactures with the rest of the world is still high relative to intra-regional trade. The evolution is quite stable over the period for Singapore, Malaysia, and Thailand whereas the barriers in Indonesia and the Philippines are constantly increasing. Barriers to inter-regional trade in Vietnam have remained the most significant although the country tends to gradually reduce them over the period.

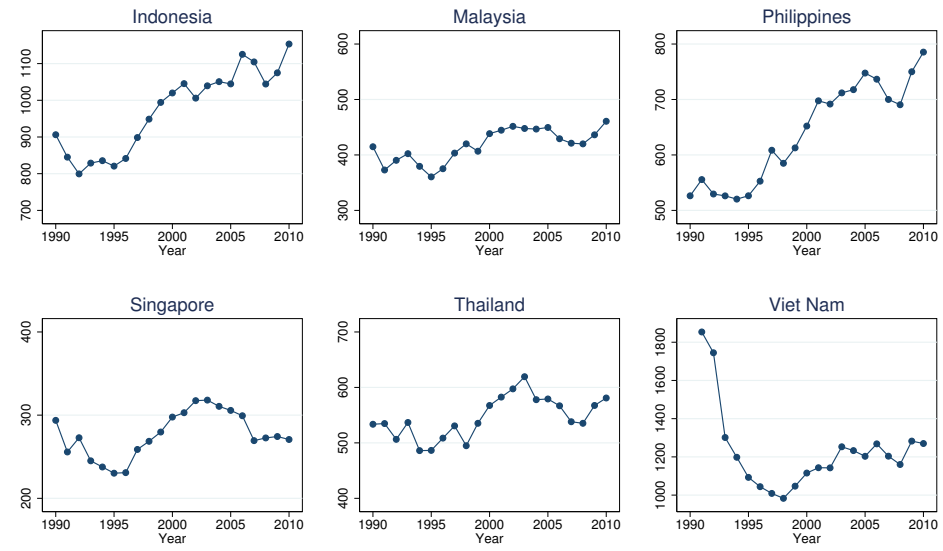
Cross-industry results: Table 2.1 shows the median value of the Novy index calculated for the combinations of the ASEAN-6 countries (intra-regional trade), for the combinations between the ASEAN-6 countries and the rest of the world (inter-regional trade), and for the combinations between the ASEAN-6 countries and the top 20 partners in 2010. I also report the estimated elasticities $\widehat{\sigma^s}$ for each industry and for intra- and inter-regional trade in the table.

The first information learned from Table 2.1 is the evidence of cross-industry

Figure 2.1 – Evolution of the ASEAN-6 Countries' Trade Integration Based on T^s Measure



Source: Author's own calculation



Source: Author's own calculation

heterogeneity in the elasticities of substitution and the level of trade costs. Moreover, their pattern quite complies with what has been found by the existing works. For example, a comparison of the estimated elasticities with those obtained from a more disaggregate analysis such as Chen and Novy (2011), who look at intra-regional trade in manufactures in 15 European Union countries at 4-digit level of the NACE Rev. 1, reveals that their value ranges from 1.8 to 41.2 with the median value equals to 6.2 against the range of 1.5 to 28.5 and the median value of 11.7 and 6.1 for intra- and inter-regional trade in my case. In addition, among my results on the highly differentiated goods with low elasticities such as "Food and beverage" (ISIC 15), I obtained the elasticities of 5.3 and 3.5 for intra- and inter-regional trade, respectively, while Chen and Novy also found relatively low elasticities for products in the food category such as "Sugar" (NACE 1583) with the elasticity being 2.6 and "Processing of fruits, vegetables" (NACE 1533) being 6.2. Within the class of less differentiated goods such as "Electrical machinery and apparatus" (ISIC 31), I obtained the elasticities of 15.8 and 8.0 for intra- and inter-regional trade whereas Chen and Novy obtained relatively high elasticities for "Accumulator" (NACE 3140) and "Electric motors" (NACE 3110) of 7.2 and 10.7, respectively.

The pattern of cross-industry trade costs in my case is also similar to Chen and Novy's findings. To illustrate this, Figure 2.2 summarizes cross-industry trade costs by boxplot distributions for all the country combinations and years in each industry and where industries are ranked in descending order by the median value of their trade costs level. Again, the Figure shows enormous heterogeneity across industries. Many of the highly integrated industries seem to be those in which goods are characterized by high transportability in terms of weight to value. Light and high-value products (i.e., low weight to value) are relatively less costly to be shipped comparing with heavy and cheap value products (i.e., high weight to value) and, thus, tend to have higher degree of trade integration. This is found to be the case for the non-traditional industries such as manufactures of electronics, information, and communication technology (ISIC 30, 32), medical and precision instruments (ISIC 33), electrical and non-electrical machinery (ISIC 29, 31) with the range of intra-regional tariff-equivalent trade costs amounted to around 60-80% in 2010. On the other hand, among the least integrated industries are manufactures with low transportability (ISIC 26: Non-metallic mineral products, ISIC 34-35: Automobile and

transport equipment, ISIC 36: Furniture), perishable goods (ISIC 15: Food and beverage), state-controlled goods (ISIC 16: Tobacco products), or sectors currently facing international trade discrimination through quota and anti-dumping measures (ISIC 17-18: Textiles and apparel).

The fact that trade costs are relatively low for highly transportable goods can help explaining why the ASEAN-6 countries can actively participate in the activities of cross-border manufacturing production which requires a high portion of imported intermediate inputs between various assembling countries. For example, intra-regional trade in parts and components of these industries takes place between the factories located in Malaysia, the Philippines, Singapore, and Thailand (Jongwanich, 2010). Moreover, there are manufactures of high-tech industries such as chemical (ISIC 24) and a resource-based industry like petroleum products (ISIC 23) who are also among the highly integrated industries for intra-ASEAN trade and relatively integrated for inter-regional trade. Given the cross-industry nature of the integration, certain ASEAN's priority sectors in manufactures are making good integration progress while it is more difficult for the others (cf. Table 2.2). Manufacturing of "Electronics and ICT sector" (ISIC 30-32), which shared more than half of total priority merchandise sectors, has always had relatively low trade costs compared with other sectors. On the other hand, automobile (ISIC 34) which is one of the most dynamic sectors in ASEAN would require good logistic support and transport network due to the low transportability of the goods.

Table 2.1 – Median Ad-Valorem Trade Costs, $T_{ij}^s - 1$, and the Estimated Elasticities, $\widehat{\sigma^s}$ (in ascending order of $\widehat{\sigma^s}$)*

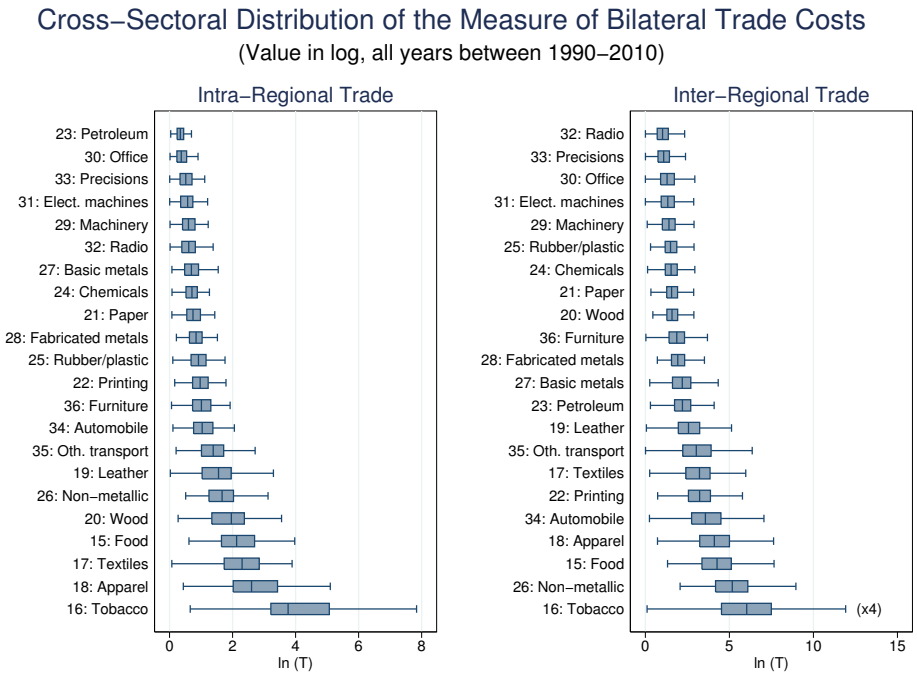
Intra-Regional Trade					Inter-Regional Trade					Major Partners‡		
Industry	$\widehat{\sigma^s}$	1990	2000	2010	Industry	$\widehat{\sigma^s}$	1990	2000	2010	1990	2000	2010
16: Tobacco	3.4	96.9	37.2	44.6	16: Tobacco	1.5	19.9†	14.5†	193†	24†	5.7†	4.7†
18: Apparel	4.9	8.5	14.8	11.6	26: Non-metallic	3.2	108.7	174.7	239.6	105.0	67.2	101.8
17: Textiles	5.1	9.7	10.6	7.9	**15: Food**	3.5	47.9	78.5	70.6	42.9	42.4	32.8
15: Food	5.3	8.0	8.9	6.2	18: **Apparel**	3.5	46.6	60.7	75.8	55.2	40.5	34.6
20: Wood	6.1	5.0	6.2	6.1	34: **Automobile**	3.9	39.8	36.2	32.1	26.7	28.4	22.7
26: Non-metallic	6.8	4.2	4.1	4.2	**17: Textiles**	4.1	23.9	27.0	23.8	19.2	14.0	13.5
19: Leather	6.9	3.4	3.6	3.9	35: Oth. transport	4.1	19.6	19.5	23.8	18.8	13.4	13.5
35: Oth. transport	7.6	1.9	3.5	3.3	19: Leather	4.5	12.4	13.0	13.1	10.0	7.6	8.1
34: Automobile	9.7	2.1	2.1	1.6	22: Printing	4.7	22.8	23.2	27.9	18.4	15.5	13.8
36: Furniture	10.2	1.6	1.7	1.8	27: Basic metals	5.6	5.2	8.4	8.9	5.1	4.6	5.0
25: Rubber/plastic	11.1	1.5	1.7	1.4	36: Furniture	6.1	4.6	5.6	6.7	4.1	3.5	3.2
28: Fabricated metals	12.3	1.2	1.4	1.3	23: Petroleum	6.2	5.9	7.5	8.4	8.4	6.2	5.2
22: Printing	12.6	1.5	1.5	1.2	28: Fabricated metals	6.5	5.2	6.1	6.4	4.4	4.1	3.8
24: Chemicals	12.9	0.9	1.0	1.1	**30: Office**	7.0	3.1	2.4	3.3	2.7	1.9	2.4
27: Basic metals	13.0	1.1	1.0	0.9	24: Chemicals	7.4	3.1	3.8	3.7	2.8	2.8	2.5
21: Paper	13.1	1.1	1.1	1.1	**20: Wood**	7.6	3.5	3.9	4.7	3.8	3.3	3.4
29: Machinery	13.9	0.7	0.8	0.9	29: Machinery	7.6	2.4	3.2	3.3	2.2	2.0	2.1
32: Radio	15.1	0.7	0.8	0.8	21: Paper	7.7	3.3	3.9	4.0	3.3	2.9	2.9
31: Elect. machines	15.8	0.9	0.8	0.8	**25: Rubber/plastic**	7.7	3.2	3.5	3.8	3.1	2.6	2.5
33: Precisions	16.0	0.6	0.7	0.7	31: Elect. machines	8.0	2.7	3.1	3.0	2.3	2.0	2.0
30: Office	19.8	0.5	0.4	0.6	33: Precisions	8.7	1.4	2.2	2.3	1.4	1.5	1.4
23: Petroleum	28.5	0.4	0.4	0.3	**32: Radio**	9.2	1.7	1.7	2.0	1.8	1.4	1.5
Median	11.7	1.5	1.5	1.4	Median	6.1	5.3	6.3	6.7	3.3	3.7	3.6

* ASEAN's priority sectors are identified by bold letters

‡ Including exports to top 20 destinations in 2010, namely, China, USA, Japan, Hong Kong, Malaysia, Singapore, Indonesia, Australia, India, Korea, Thailand, Germany, Vietnam, the Philippines, Netherlands, Great Britain, France, Switzerland, Belgium, and Italy.

† denotes the value has been multiplied by 10^9.

Figure 2.2 – The Progress of Trade Integration Differs across Sectors



2.4.2 Driving Force of the Integration

How consistent is the Novy index as a measure of manufacturing trade integration of the ASEAN-6 countries? I examine this issue with help from an econometric analysis on impact of some trade cost components in explaining the variation of the Novy index. To this end, I estimate the gravity model specified in the Eq. (2.5) where results of the overall industries are provided in Table 2.3. The basic model in column (1) only includes geography variables which serve as proxies for transport costs. Several measures aimed at liberalizing trade barriers could also be considered for which I will focus on regional/multilateral measure, country-industry specific measure, and country-level measure. These are the bilateral and plurilateral agreements on trade and economic partnership (columns 2 and 3), tariff cuts (column 4), and trade facilitation measures (columns 5 and 6).

Results on the coefficient of determination R^2 in Table 2.3 suggest that our regressors explain quite well the variation of the Novy index over countries,

industries, and years, with the values varying between 71%-74% in all regressions, a finding which appears to be consistent with similar specifications used in the existing work (Chen and Novy (2011, Table 2) obtained about 60% in their estimations).

Geography variables: In column (1), all geography variables show significant effects and expected signs, except for the common-colonizer dummy variable $COMCOL_{ij}$ which does not show a significant impact. Trade costs increase both international distance d_{ij} and domestic distance $d_{ii} \times d_{jj}$ by about 13% for an increase of distance by one kilometer. This result provides that the quality of domestic transportation in the ASEAN-6 countries is equally as important as the international quality. In addition, trade costs tend to be 34% lower between a pair of contiguous countries $CONTIG_{ij}$, 30% lower between two countries that speak the same language $LANG_{ij}$, and 40% lower between two former colonizer-colony countries [10]. The greater contribution from the colonizer-colony dummy variable can be explained by the fact that former colonizers like Great Britain, France, Portugal, the US, and the Netherlands are among the important trade partners of the ASEAN region.

Bilateral/plurilateral policy variables: In column (2), I compare the impact of membership in a common trade agreements at bilateral or regional level ($RTA_{ij,t}$) and at multilateral level ($GATT/WTO_{ij,t}$). Both types of agreements

10. The effects are calculated as $(e^{\hat{\delta}} - 1) \times 100$ percent where $\hat{\delta}$ is the obtained estimated coefficient.

Table 2.2 – ASEAN's Priority Integration Sector in Manufactures: Summary of the Novy Index and their Growth Rates between 2000-2010 (in parenthesis)

Sectors and ISIC equivalent	Intra-Regional Trade	Inter-Regional Trade	Major Partners
1. Electronics and ICT (ISIC 30, 32)	Low (+50%, 0%)	Low (+38%, +26%)	Low (+26%, +7%)
2. Agro-based (ISIC 15)	High (-30%)	High (-70.6%)	High (-24%)
3. Textiles and apparel (ISIC 17, 18)	High (-25%, -22%)	High (-4%, -15%)	High (-4%, -15%)
4. Wood based (ISIC 20)	High (-2%)	Low (+21%)	Low (+26%)
5. Rubber (ISIC 25)	Medium (-18%)	Low (+9%)	Low (-4%)
6. Automotive (ISIC 34)	Medium (-24%)	High (-11%)	High (-20%)

Source: Author's own calculation. ICD = information and communication technology. The weight of these sectors in total merchandise exports of the priority sectors are:
79%, 9%, 7%, 4%, 3%, 3%, respectively (Wattanapruttipaisan, 2008).

Table 2.3 – Driving Force of Trade Integration in Manufactures of the ASEAN-6 Countries

Dep. Var = $\ln(T^s_{ij,t})$	(1)	(2)	(3)	(4)	(5)	(6)
Period	1990-2010	1990-2010	1990-2010	1990-2010	2005-2010	2004-2010
Geography						
$\ln d_{ij}$	0.12^a	0.17^a	0.01	0.09	0.34^a	0.21^a
	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.08)
$\ln d_{ij} \times \ln d_{jj}$	0.12^b	0.11^b	0.13^b	0.19^a	-0.03	0.11^c
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)
$CONTIG_{ij}$	-0.41^b	-0.48^b	-0.33^b	-0.10	-0.27	-0.36
	(0.17)	(0.19)	(0.14)	(0.13)	(0.23)	(0.31)
$LANG_{ij}$	-0.33^a	-0.29^a	-0.36^a	-0.43^a	-0.14	-0.30^a
	(0.08)	(0.07)	(0.08)	(0.09)	(0.11)	(0.10)
COL_{ij}	-0.55^a	-0.51^a	-0.51^a	-0.47^a	-0.46^a	-0.47^a
	(0.09)	(0.09)	(0.08)	(0.11)	(0.11)	(0.18)
$COMCOL_{ij}$	0.15	0.09	0.08	-0.18	-0.13	0.13
	(0.10)	(0.10)	(0.10)	(0.15)	(0.14)	(0.19)
Bilateral/Plurilateral Policy Variables						
$RTA_{ij,t}$		-1.40^a		-1.24^a	-1.23^a	-1.22^a
		(0.11)		(0.11)	(0.15)	(0.17)
$GATT/WTO_{ij,t}$		-0.36^a				
		(0.05)				
$AFTA_{ij,t}$			-1.44^a			
			(0.12)			
$AICO_{ij,t}$			-0.37^a			
			(0.09)			
$ASEAN+3_{ij,t}$			0.11			
			(0.10)			
$APEC_{ij,t}$			-0.13^b			
			(0.06)			
$\ln(1+tar^s_{ij,t})(1+tar^s_{ji,t})$				3.37^a		
				(0.70)		
Unilateral Policy Instruments						
$\ln Cost_{ij,t}$					0.28^a	
					(0.05)	
$\ln Doc_{ij,t}$					-0.76^a	
					(0.17)	
$\ln Time_{ij,t}$					1.01^a	
					(0.16)	
$\ln Bribe_{ij,t}$						-0.18
						(0.38)
$\ln Air_{ij,t}$						-1.46^b
						(0.59)
$\ln Port_{ij,t}$						-0.88^c
						(0.50)
Obs.	102,076	102,076	102,076	31,354	41,715	17,868
R^2	0.73	0.73	0.73	0.71	0.74	0.73

Robust standard errors in parentheses, clustered at country-pair level. Time-, industry-fixed effects in all regression.
^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

are effective in reducing trade barriers although to a lower extent for the multilateral agreement; entering into an RTA tend to reduce trade barriers of the member countries by 75% against 30% under GATT/WTO. This finding lines up with a large body of empirical works on the puzzling trade-enhancing effect in the participating countries of the GATT/WTO, suggesting a number of explanations towards the difficulty in lowering trade barriers. Among the explanations are existing special or most-favored-nation treatments granted to developing member countries, the type of sectors in negotiation, or membership duration (Rose, 2004; Subramanian and Wei, 2007; Tomz *et al.*, 2007; Liu, 2009).

In column (3), I break down the general impact of RTA to consider dummy variables capturing the effect of some important regional trade agreements and pan-regional economic partnership agreements in which the ASEAN countries have taken part. These are ASEAN Free Trade Area ($AFTA_{ij,t}$), ASEAN Industrial Cooperation Scheme ($AICO_{ij,t}$), the ASEAN+3 ($ASEAN+3_{ij,t}$), and Asia-Pacific Economic Cooperation ($APEC_{ij,t}$) [11]. Estimation shows the effectiveness of the ASEAN agreements where AFTA strongly contributes to the removal of trade barriers for the ASEAN-6 countries (-76%) ahead of the AICO scheme (-30%), and APEC (-12%). On the other hand, ASEAN+3 tend to have no significant impact in reducing trade barriers. The fact that pan-regional cooperation shows lower or insignificant impact could be explained by competition in exports of similar goods (ASEAN+3) or the objective of the groups, which is to facilitate intra-regional trade and investment rather than tariff elimination through specific binding agreements [12].

In column (4), I examine the role of industry-specific bilateral tariffs where I find a relatively stronger impact than RTA. Raising tariff protection signif-

11. The AICO scheme has been in place since 1996 to facilitate joint manufacturing activities between ASEAN-based companies of both ASEAN and non-ASEAN nationalities by providing preferential tariff rates similarly to AFTA. ASEAN+3 was established in 1997 and includes the ASEAN members and the three East Asia nations of China, Japan, and South Korea. APEC founded in 1989 includes currently 21 members, namely, Australia, Canada, Chile, China, Hong Kong, Mexico, New Zealand, Papua New Guinea, Peru, Russia, Taiwan, and United States among others. Members of the ASEAN+3 are also members of APEC excluding currently Cambodia, Laos, and Myanmar.

12. Although the APEC leaders, in the 2001 Shanghai Declaration, have shown their commitment in lowering trade transaction costs by 5% and additional 5 % in 2005, recent quantitative results show that the pace of progress differs largely across members which can influence the effectiveness of the group (Shepherd, 2010a).

icantly increases trade frictions, and hence lowering trade integration, with elasticity point estimate of 3.4.

Unilateral Policy Measures: In the last two columns, I investigate the role of trade facilitation measures that concern reforms to reduce fixed costs and variable costs related to customs clearance. So far, the ASEAN countries have made significant effort in improving customs clearance of goods and reducing the cost of doing business in ASEAN through the implementation of the ASEAN Single Window program (ASEC, 2008; Urata and Ando, 2010) although the effectiveness seems to vary widely across countries (Shepherd and Wilson, 2008; Otsuki, 2011). However, unlike tariffs and RTAs, the impact of trade facilitation is broader and non-discriminatory; it is not product- nor partner-specific and hence boosts trade with the rest of the world, too. Moreover, there is empirical evidence providing that trade measures aimed at reducing non-tariff trade costs often exert higher impact on trade than tariff cuts, and that improving trade facilitation at home is an important factor in improving market access abroad (Hertel and Keeney, 2006; Shepherd and Wilson, 2008; Shepherd, 2010b).

In column (5), I first look at the quality of customs administration by incorporating three categories of Doing Business' trade facilitation indicators that are total official costs per capita income (non-related to tariffs) $Cost_{ij,t}$, documentation $Doc_{ij,t}$, and lead time to complete export/import transaction between trading countries $Time_{ij,t}$. RTA coefficient remains significant and is the most important among other determinants. There is evidence proving that more red tape will be burden to lowering trade barriers. Administrative costs related to customs clearance contribute to an increase in trade costs by 32%. However, I find the strongest impact of time delays in trade, a result which lines up well with the findings on customs timeliness especially for trade in developing countries (Djankov *et al.*, 2010; Freund and Rocha, 2010). In fact, I find that one additional day that a product is delayed prior to being shipped would tend to increase trade costs by 175%. This may be explained by ASEAN's considerable export share in time-sensitive goods such as perishable goods (e.g., food and beverage) as well as parts and components (e.g., electronics, electrical and non-electrical machinery, and automotive) that require timely delivery in order to ensure good functioning supply chain activities. On

the other hand, in contrast to my expectation, I find that the number of official documents actually reduces trade costs significantly, i.e., by about 50% for an additional document required. It could be that ASEAN's exports in certain goods that have generally low level of trade costs, e.g., highly transportable and non-traditional manufactures, requires more certified documents before shipment.

In column (6), I use another set of indicators gathered from World Competitiveness Report to capture the impact of customs transparency and infrastructure quality. The first variable is the score on the level of undocumented extra payment or any forms of bribe connected with exports/imports $Bribe_{ij,t}$. The other two variables are scores on air transport $Air_{ij,t}$ and port infrastructures $Port_{ij,t}$. All three variables show a negative coefficient which should be interpreted as an increase of trade costs involved in a downgrade of the index by one point. Yet, only customs bribery does not show significant result which is in contrast to the finding on transparency of trade environment (Helbe *et al.*, 2007). It could be that such practice can help to accelerate custom clearance procedure, saving the loss in opportunity costs associated with time delays. The strongest impact is found to be the quality of air transport, reducing greatly trade costs by 3.3 times which overrides the impact of sea port facilities whose impact is about five times lower. This finding joins the previous result that timeliness is the most important facet of trade facilitation in our case.

2.5 How Important Is the Trade Integration?

Having measured the level of trade costs and investigate their determinants, I now turn to the last econometric analysis investigating potential benefits that the ASEAN-6 countries may gain from effectively reducing trade costs. I investigate the implication on export performance in manufactures using the Redding and Venables'(2003) export equation where foreign market access is the export determinant that I am interested in. I expect the prospect of trade integration on export performance if there is a positive relationship between manufacturing exports and FMA such that (i) exports across industries are positively determined by FMA and (ii) the impact of FMA is increasing in the level of exports.

Table 2.4 reports cross-industry estimation results of the export equation

where I use manufacturing output as a proxy for supply-capacity factor. It shows that, even accounting for production capacity, the mechanism of economic geography is at work at industry-level where all of the intra-regional exports are responsive to FMA as well as all of the inter-regional exports, except for the manufactures of textiles and apparel (ISIC 17, 18).

In addition, there is an interesting result that cross-industry heterogeneity in the elasticity of substitution seems to amplify the impact of FMA; the export-stimulating effect is stronger in industries where product varieties are relatively less differentiated (i.e., high $\hat{\sigma}$). The underlying explanation is that, as importers prefer a large variety for the imported goods and due to existence of international trade costs, the strong preference for the diversity drives a location with strong foreign market access to export more than a location with lower market access.

Moreover, the impact seems to be stronger in the non-traditional sectors where many of the FMA coefficients are nearly equal to one. As a result, increasing trade integration would also yield benefits to exports of parts and components that are required in manufactures of these goods. This appears to be the case for the ASEAN's Priority Integration Sectors in high-tech categories such as electronics and computing goods (ISIC 30, 32) and automobiles (ISIC 34).

I turn to investigate the determinants of cross-country variation in manufacturing exports. Following Fugazza (2004), I resort to quantile regression (QR) which enables us to investigate how the impact of FMA as well as other export determinants evolve as export level increases. We could however apply OLS regressions in each subset of under- and over-performing sectors but we would ignore how the impact on a sector is conditional on the entire distribution of the remaining sectors in the dataset. Moreover, QR estimator is robust to the presence of outliers unlike traditional conditional mean estimation such as the standard OLS.

In the following, I consider five conditional quantiles of export values, i.e., 10th (Q10), 25th (Q25), the median (Q50), 75th (Q75), and 90th (Q90), where the lower quantiles refer to the under-performing sectors in terms of export value. Table 2.16 in Appendices reports the country-industry positions at these quantiles where industries are sorted in ascending order according to their average exports between 1990-2010. Regarding the estimation results, I provide

Table 2.4 – Cross-Industry Results on FMA and Supply Capacity (with Output as Proxy)

ISIC Rev. 3	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Obs.
	Intra-Regional Trade				Inter-Regional Trade				
	$\hat{\sigma}$	$\ln FMA^s_{it}$	$\ln Output^s_{it}$	R^2	$\hat{\sigma}$	$\ln FMA^s_{it}$	$\ln Output^s_{it}$	R^2	
15: Food	5	0.28^a	0.14^a	0.53	3	0.29^a	0.16^a	0.43	120
		(0.07)	(0.05)			(0.08)	(0.05)		
16: Tobacco	3	0.44^a	0.13	0.47	1	0.60^a	0.28^a	0.61	116
		(0.10)	(0.11)			(0.08)	(0.07)		
17: Textiles	5	0.14^a	0.18^a	0.27	4	-0.25^a	-0.01	0.55	120
		(0.04)	(0.06)			(0.03)	(0.04)		
18: Apparel	5	0.27^a	0.24^a	0.27	4	-0.05	0.06	0.58	118
		(0.07)	(0.06)			(0.10)	(0.05)		
19: Leather	7	0.45^a	0.32^a	0.57	5	0.34^a	0.41^a	0.64	120
		(0.06)	(0.06)			(0.11)	(0.04)		
20: Wood	6	0.21^c	0.12	0.09	8	0.56^a	0.31^a	0.27	120
		(0.12)	(0.10)			(0.14)	(0.08)		
21: Paper	13	0.65^a	0.35^a	0.48	8	0.94^a	0.50^a	0.65	120
		(0.13)	(0.12)			(0.15)	(0.09)		
22: Printing	13	0.79^a	0.25^a	0.81	5	0.79^a	0.28^a	0.84	120
		(0.08)	(0.07)			(0.06)	(0.05)		
23: Coke	28	0.88^a	0.01	0.88	6	0.88^a	0.10^a	0.88	114
		(0.07)	(0.05)			(0.05)	(0.03)		
24: Chemicals	13	0.63^a	0.15	0.60	7	0.95^a	0.31^a	0.83	120
		(0.11)	(0.10)			(0.08)	(0.06)		
25: Rubber/plastic	11	0.66^a	0.25^b	0.59	8	0.81^a	0.32^a	0.69	119
		(0.12)	(0.10)			(0.13)	(0.07)		
26: Non-metal	7	0.55^a	0.22^a	0.56	3	0.47^a	0.24^a	0.68	120
		(0.09)	(0.08)			(0.07)	(0.04)		
27: Basic metal	13	0.53^a	0.25^a	0.60	6	0.80^a	0.30^a	0.74	120
		(0.07)	(0.07)			(0.10)	(0.06)		
28: Fabricated metal	12	0.85^a	0.32^a	0.72	7	0.96^a	0.35^a	0.81	120
		(0.09)	(0.07)			(0.11)	(0.06)		
29: Machinery	14	0.82^a	0.23^a	0.85	8	0.86^a	0.19^a	0.88	119
		(0.06)	(0.04)			(0.07)	(0.04)		
30: Office	20	0.86^a	0.15^a	0.87	7	0.80^a	-0.06^c	0.95	119
		(0.08)	(0.06)			(0.05)	(0.03)		
31: Elect. machinery	16	0.70^a	0.35^a	0.74	8	0.48^a	0.11^c	0.77	120
		(0.10)	(0.07)			(0.09)	(0.06)		
32: Radio	15	0.85^a	0.21^a	0.88	9	0.89^a	0.18^a	0.92	120
		(0.10)	(0.07)			(0.08)	(0.06)		
33: Precision	16	0.89^a	0.26^a	0.86	9	0.79^a	0.13^a	0.95	120
		(0.09)	(0.06)			(0.05)	(0.03)		
34: Motor vehicles	10	0.83^a	0.34^a	0.76	4	0.62^a	0.17^a	0.79	120
		(0.11)	(0.09)			(0.06)	(0.05)		
35: Oth. transport	8	0.75^a	0.35^a	0.69	4	0.52^a	0.07	0.82	119
		(0.07)	(0.07)			(0.08)	(0.06)		
36: Furniture	10	0.65^a	0.37^a	0.55	6	0.56^a	0.28^a	0.57	120
		(0.09)	(0.08)			(0.14)	(0.07)		

Bootstrapped standard errors in parentheses (200 replications). Significance levels: ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

Year-fixed effects in all regressions.

ASEAN's Priority Integration Sectors in manufactures are indicated in bold letter.

in Tables 2.5 and 2.6 for the standard OLS and QR respectively. Finally, in order to have a clear picture of how the impact of export determinants evolve over quantiles, I plot the the results of Table 2.6 in Figure 2.3 along with their respective confidence intervals. The horizontal lines are the OLS point estimates and the 95% confidence intervals which do not vary with the quantiles.

Beginning with OLS results in Table 2.5, export determinants are added one at a time to check for the robustness of their impacts. As expected, we always observe a positive relationship between manufacturing exports and foreign market access throughout. The final specification in column (6) shows that all of the supply-capacity coefficients but the quality of domestic institutions ($\ln Corrup_{it}$) are significant with expected signs, providing that low unit labor costs, the abundance of manufacturing labor supply, contribution of FDI in capital formation, and depreciation of the national currency all contribute on average to an increase in manufacturing exports of the ASEAN-6 countries.

Results on QR estimations in Table 2.6 further suggest that the coefficients on our export determinants have remained significant with the expected signs and they tend to vary across quantiles. However, the coefficients on real average exchange rate now show the expected impact only in well-performing export levels (those above the 75th quantile) whereas the coefficient on corruption index has always remained insignificant throughout.

In particular, there is the expected result that the coefficients on foreign market access increase in manufacturing export levels, complying to our expectation about the prospect of the integration on manufacturing export performance as countries' foreign market access improves. The impact is about 30% stronger in the highest quantile compared with the lowest one.

Turning to the effects of the supply-capacity variables. The coefficients on manufacturing wage and labor force still exert the expected impact in all range of export but they are decreasing at higher quantiles. While manufacturing exports of the ASEAN-6 countries generally relies on countries' comparative advantages in wage and labor supply, they are less important when the exports become competitive; the impact decline by about 20% for wage and 11% for labor force between export levels of the 10th and 90th quantiles. This result could be driven by the fact that, as the countries develop their external sectors, production technology becomes less labor intensive or requires skilled labor

Table 2.5 – Export Performance: Contributions from FMA and Supply Capacity Factors

Dep. Var = $\ln X^s_{it}$	(1)	(2)	(3)	(4)	(5)	(6)
$\ln FMA^s_{it}$	0.28^a	0.30^a	0.55^a	0.46^a	0.45^a	0.45^a
	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)
$\ln w^s_{it}$		-0.42^a	-0.43^a	-0.40^a	-0.37^a	-0.37^a
		(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$\ln l^s_{it}$			0.88^a	0.90^a	0.90^a	0.90^a
			(0.03)	(0.03)	(0.03)	(0.03)
FDI^s_{it}				0.13^a	0.15^a	0.14^a
				(0.02)	(0.02)	(0.02)
$\ln ER_{it}$					0.25^a	0.20^c
					(0.07)	(0.10)
$\ln Corrup_{it}$						-0.07
						(0.12)
Obs	2,196	1,208	1,208	1,119	1,119	1,119
R^2	0.67	0.77	0.88	0.90	0.90	0.90
$RMSE$	1.03	0.82	0.59	0.53	0.53	0.53

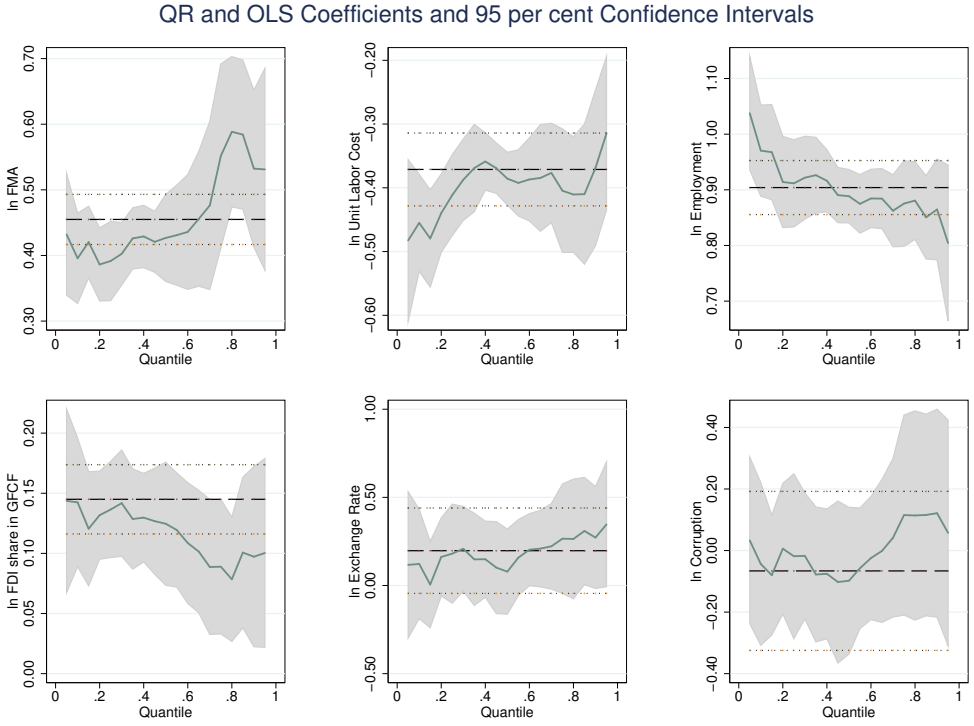
Bootstrapped standard errors in parentheses (200 replications).
Significant levels: ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$.
Country-, industry-, and year-fixed effects in all regressions.

Table 2.6 – Export Performance: Fixed-Effect Quantile Regressions

Dep. Var = $\ln X^s_{it}$	(1) Q10	(2) Q25	(3) Q50	(4) Q75	(5) Q90
$\ln FMA^s_{it}$	0.40^a	0.40^a	0.43^a	0.55^a	0.53^a
	(0.04)	(0.03)	(0.04)	(0.07)	(0.06)
$\ln w^s_{it}$	-0.46^a	-0.41^a	-0.39^a	-0.40^a	-0.37^a
	(0.05)	(0.04)	(0.03)	(0.05)	(0.07)
$\ln l^s_{it}$	0.97^a	0.91^a	0.89^a	0.88^a	0.86^a
	(0.05)	(0.04)	(0.03)	(0.04)	(0.05)
$\ln FDI^s_{it}$	0.14^a	0.14^a	0.12^a	0.09^a	0.10^a
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
$\ln ER_{it}$	0.12	0.18	0.08	0.27^b	0.27^c
	(0.17)	(0.17)	(0.13)	(0.13)	(0.16)
$\ln Corrup_{it}$	-0.04	-0.02	-0.10	0.12	0.12
	(0.17)	(0.15)	(0.13)	(0.15)	(0.17)
Obs.	1,119	1,119	1,119	1,119	1,119
Pseudo-R^s	0.74	0.71	0.70	0.70	0.72

Bootstrapped standard errors in parentheses (200 replications).
Significance levels: ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$
Country-, industry-, year-fixed effects in all regressions.

Figure 2.3 – Cross-Country and Cross-Industry Results: The Effects of Manufacturing Export Determinants at Various Export Quantiles



force such that any changes in wage premium or labor supply would affect less the production capacity of these sectors.

Regarding the impact of inward FDI, there is a claim that it can increase exports of the developing host countries by helping them to acquire new capital and catching up in production technology. I obtain significant FDI coefficients in all export levels although in a slightly decreasing pattern. We can conclude that export-stimulating effect of FDI is relatively more important in early stage of export development where there is a stronger need in capital formation and technology upgrade compared with the already well-performing sectors

Finally, looking at variables related to competitiveness of export environment that are exchange rate and the quality of domestic institutions, I do not find any significant impact of corruption control in all export levels. On the other hand, there is positive and significant evidence of national currency depreciation for export levels above the 75th quantile. This finding could be driven by a gain in price competitiveness for exports of both final and intermediate goods related to manufactures of electronics and machinery whose exports constitute the majority of manufactures in this export range. [13] Consequently, a stable macroeconomic environment would be a necessary condition accompanying the high-performing export sectors of the ASEAN-6 countries.

2.6 Conclusion

In this chapter, I evaluate the integration progress in reducing manufacturing trade costs of the principal ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam, or the ASEAN-6 countries) in 22 industries between 1990 to 2010. In addition, the sources of trade barriers have been explored as well as the integration prospect on the exports performance of these countries. My empirical workhorses are Novy index of bilateral trade costs (Novy, 2009) and Redding and Venables' structural export equation derived from new economic geography (NEG) framework (Redding and Venables, 2003, 2004b). Although there have been studies evaluating the progress of ASEAN integration and those investigating manufacturing export

13. Jongwanich (2009) finds that misalignment of real exchange rate with respect to its equilibrium value (e.g. an over-valuation of national currency) is detrimental to export performance in electronics and machinery sectors in the Asian developing countries as their production process involves a high portion of imported inputs.

performance of the ASEAN countries, my work complements these studies by providing quantitative assessment at industry-level and accounting for the impact of economic geography on the export performance.

The ASEAN-6 countries seem to make a significant progress in reducing intra-regional trade barriers in the past two decades where AFTA has greatly contributed to this success. Nonetheless, further efforts would be required to promote integration of the countries into global economy. As a result, aside from efforts in cutting tariffs, the countries would stand to reap the benefit from infrastructure development that aims to reduce both domestic and international natural barriers to goods transportation. The countries can also expect potential gain from trade facilitation development, including dimensions such as customs integration and international transport connectivity. Since time delays appear to be the biggest trade burden of the ASEAN countries, increasing customs efficiency by reducing the time required to comply with customs clearance procedures as well as developing air transport net work (which is one of the ASEAN's Priority Integration Sector) are among measures to effectively promote the integration.

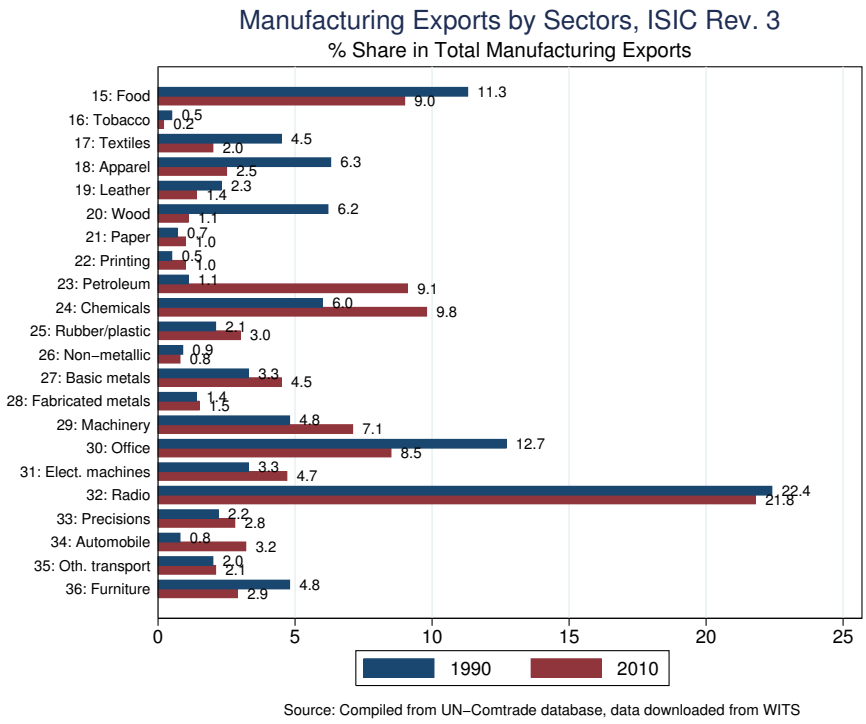
My results also provide evidence that improving trade integration would improve market access conditions which, in turn, affect the countries' export performance. In addition, cross-country and cross-industry results on export determinants shed light on the mutual impact of foreign market access and supply-side factors in defining the export performance. As a result, any policy initiatives to promote ASEAN's export performance should acknowledge the contribution of these two components and their relative importance at various export development stages.

In particular, improving linkages to international markets should be the priority of the countries that have acquired a certain level of export competitiveness in the industry in question. Example of the integration initiatives at this stage could be facilitating intra- and inter-regional trade in intermediate goods along with lowering barriers to trade in final goods. Lowering trade barriers implies also that existing firms in each country being more exposed to import competition. As a result, improving market linkages may be a second priority at the early stage of export development where efforts should be allocated more to capacity building in manufacturing labor force and technology upgrade which could be facilitate, for example, by policy measures to attract

further inward FDI.

2.A Appendices

2.A.1 Manufacturing Exports in ASEAN



Source: Compiled from UN−Comtrade database, data downloaded from WITS

Figure 2.4 – ASEAN's Trading Partners in Manufactures and Accessibility to Their Markets

The growth figure is measured for each partner country with respect to the US.

Table 2.7 – ASEAN's Exports of Manufactures to Major Destinations (Sorted by the Top 20 in 2010

Value in Mn USD	2000	2005	2010
China	12.8	42.8	91.6
United States	75.9	86.6	90.8
Japan	42.8	53.5	70.8
Hong Kong, China	21.4	39.5	69.3
Malaysia	28.0	38.3	57.1
Singapore	30.2	36.5	50.4
Indonesia	6.3	28.3	45.8
Australia	7.8	16.0	29.0
India	5.3	10.8	28.8
Korea, Rep.	10.8	15.8	28.4
Thailand	10.6	18.5	26.5
Germany	11.1	13.9	20.1
Vietnam	3.6	8.6	18.2
Philippines	7.0	9.3	18.0
Netherlands	9.0	14.3	17.5
United Kingdom	11.9	12.3	13.7
France	4.9	7.8	11.4
Switzerland	1.2	1.5	8.3
Belgium	3.5	3.9	6.8
Italy	2.7	3.5	5.9

2.A.2 Dataset

Table 2.8 – List of countries included in the dataset which accounted altogether for 95 percent of exports/imports in manufactures with the ASEAN-6 countries† between 1990-2010

Argentina	Finland	Macao	Romania
Australia	France	Malaysia	Russian Federation
Austria	Germany	Malta	Singapore
Bangladesh	Greece	Mexico	South Africa
Belgium	Hong Kong, China	Morocco	Spain
Luxembourg	Hungary	Netherlands	Sri Lanka
Brazil	India	New Zealand	Sweden
Bulgaria	Indonesia	Norway	Switzerland
Canada	Iran, Islamic Rep.	Pakistan	Thailand
Chile	Ireland	Panama	Turkey
China	Israel	Peru	Ukraine
Costa Rica	Italy	Philippines	United Kingdom
Czech Republic	Japan	Poland	United States
Denmark	Korea, Rep.	Portugal	Vietnam
Egypt, Arab Rep.	Kuwait	Qatar	

Note: † The ASEAN-6 countries refer to Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam.

Table 2.9 – List of Manufacturing Industries at 2-digit Level of ISIC Rev. 3

ISIC 3	**Abbreviation**	**Manufacturing Industry**
15	Food	Food products and beverages
16	Tobacco	Tobacco products
17	Textiles	Textiles
18	Apparel	Wearing apparel, dressing, and dyeing of fur
19	Leather	Leather, leather products, and footwear
20	Wood	Wood and products of wood and cork, except furniture
21	Paper	Paper and paper products
22	Printing	Printing and reproduction of recorded media
23	Petroleum	Coke, refined petroleum products and nuclear fuel
24	Chemicals	Chemicals and chemical products
25	Rubber/plastic	Rubber and plastic products
26	Non-metallic	Non-metallic mineral products
27	Basic metals	Basic metals
28	Fabricated metal	Fabricated metal products, except machinery and equipment
29	Machinery	Machinery and equipment n.e.c.
30	Office	Office, accounting, and computing machinery
31	Elect. machines	Electrical machinery and apparatus n.e.c.
32	Radio	Radio, television and communication equipment and apparatus
33	Precisions	Medical, precision and optical instruments, watches and clocks
34	Automobile	Motor vehicles, trailers and semi-trailers
35	Oth. transport	Other transport equipment (ISIC 35)
36	Furniture	Furniture, manufacturing n.e.c.

Table 2.10 – Trade Cost Components: Variable Description and Data Sources

Variable	Description	Year	Sources
d_{ij}	Great circle distance between the largest cities in countries i and j weighted by respective population sizes.	NA	CEPII
d_{ii}	Domestic trade distance measured as $d_{ii} = 2/3\sqrt{A/\pi}$, where A is the country's area (Head and Mayer, 2002).	NA	CEPII
$CONTIG_{ij}$	Dummy variable equals to 1 if countries i and j share common land frontier, else zero	NA	CEPII
$LANG_{ij}$	Dummy variable equals to 1 if countries i and j use the same official language, else zero	NA	CEPII
COL_{ij}	Dummy variable equals to 1 if countries i and j share colonizer-colony relationship, else zero	NA	CEPII
$COMCOL_{ij}$	Dummy variable equals to 1 if countries i and j share common colonizer, else zero	NA	CEPII
$RTA_{ij,t}$	Dummy variable equals to 1 if countries i and j belong to a common regional trade agreement	1990-2010	WTO's RTA database
$tar^s_{ij,t}$	Weighted average tariff effectively applied to imports of j from i in industry s for year t (in percentage), where $tar^s_{ij,t} \neq tar^s_{ji,t}$	1990-2010	UNCTAD's TRAINS
$Doc_{ij,t}$	Simple average of total export documents in i and total import documents in j required per one shipment of goods from i to j.	$2005-2011^{\dagger}$	World Bank's Doing Business
$Cost_{ij,t}$	Simple average value of official non-tariff fees levied on a 20-foot container in USD to be exported from i and imported to j. The costs are expressed as percentage of per capita GDP to account for different business constraint in developed and developing countries.	$2005-2011^{\dagger}$	World Bank's Doing Business
$Time_{ij,t}$	Simple average of lead time (days) to export/import between i and j	$2005-2011^{\dagger}$	World Bank's Doing Business
$Bribe_{ij,t}$	Simple average of the score obtained from responses to the question: "In your country, how common is it for firms to make undocumented extra payments or bribes connected with imports and exports? (1 = very common; 7 = never occur)"	$2006-2012^{\ddagger}$	World Economic Forum's Global Competitiveness Report
$Air_{ij,t}$	Simple average of air transport infrastructure quality in countries i and j based on responses to the question: "How would you assess passenger air transport infrastructure in your country? (1 = extremely underdeveloped; 7 = as efficient by international standards)"	$2006-2012^{\ddagger}$	World Economic Forum's Global Competitiveness Report
$Port_{ij,t}$	Simple average of maritime infrastructure quality in countries i and j based on responses to the question: "How would you assess the port facilities in your country? (1 = extremely underdeveloped; 7 = as efficient by international standards)"	$2006-2012^{\ddagger}$	World Economic Forum's Global Competitiveness Report

† and ‡ indicate that values are taken respectively as a lag of 1 and 2 years as to match with the time frame of the dataset.

Table 2.12 – Summary statistics: Determinants of Trade Integration Regressions

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
I: $\ln T^s_{ij,t}$	2.52	3.08	0	49.75	100,866
II: $\ln d_{ij}$	8.80	0.77	6.23	9.88	100,866
III: $\ln d_{ii} \times d_{jj}$	5.14	0.89	1.44	6.8	100,866
IV: $CONTIG_{ij}$	0.03	0.17	0	1	100,866
V: $LANG_{ij}$	0.12	0.32	0	1	100,866
VI: COL_{ij}	0.02	0.15	0	1	100,866
VII: $COMCOL_{ij}$	0.05	0.22	0	1	100,866
VIII: $\ln Cost_{ij,t}$	-1.81	1.01	-4.62	0.59	41,303
IX: $\ln Doc_{ij,t}$	1.76	0.2	1.1	2.35	41,303
X: $\ln Time_{ij,t}$	2.69	0.37	1.5	3.56	41,303
XI: $\ln Bribe_{ij,t}$	1.48	0.19	1.02	1.9	17,623
XII: $\ln Air_{ij,t}$	1.65	0.14	1.18	1.93	41,303
XIII: $\ln Port_{ij,t}$	1.5	0.21	0.89	1.92	41,303

Table 2.13 – Matrix of correlation: Determinants of Trade Integration Regression

Variables	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I:	1.00												
II:	0.09	1.00											
III:	0.11	0.19	1.00										
IV:	-0.08	-0.41	0.02	1.00									
V:	-0.06	-0.13	-0.29	0.09	1.00								
VI:	0.01	0.11	0.03	-0.03	0.10	1.00							
VII:	-0.05	-0.25	-0.29	0.17	0.29	-0.04	1.00						
VIII:	0.11	-0.20	0.50	-0.03	-0.16	-0.02	-0.11	1.00					
IX:	0.06	-0.15	0.42	0.04	-0.09	-0.05	-0.04	0.62	1.00				
X:	0.12	-0.11	0.60	0.03	-0.30	-0.08	-0.11	0.77	0.70	1.00			
XI:	-0.10	0.12	-0.59	-0.00	0.23	0.04	0.18	-0.80	-0.66	-0.77	1.00		
XII:	-0.12	0.03	-0.51	0.06	0.17	0.03	0.18	-0.75	-0.52	-0.69	0.83	1.00	
XIII:	-0.12	-0.00	-0.53	0.07	0.19	0.05	0.22	-0.77	-0.54	-0.73	0.86	0.92	1.00

Table 2.16 – Distribution of the ASEAN-6 Manufacturing Exports: Positions of Countries and Industries according to the Average Value of the Total Manufacturing Exports between 1990-2010 in Mn USD

Quantile	Country	Industry	Exports	Quantile	Country	Industry	Exports
10	THA	16: Tobacco	0.005	50	IDN	28: Fabricated metals	0.591
10	PHL	22: Printing	0.028	50	IDN	26: Non-metallic	0.598
10	VNM	21: Paper	0.056	50	VNM	30: Office	0.606
10	PHL	16: Tobacco	0.058	50	THA	21: Paper	0.646
10	VNM	22: Printing	0.062	50	IDN	35: Oth. transport	0.649
10	PHL	21: Paper	0.117	50	PHL	29: Machinery	0.679
10	IDN	22: Printing	0.129	50	THA	20: Wood	0.701
10	IDN	16: Tobacco	0.146	50	VNM	29: Machinery	0.744
10	VNM	23: Petroleum	0.175	50	MYS	26: Non-metallic	0.791
10	MYS	16: Tobacco	0.182	50	VNM	32: Radio	0.852
10	VNM	34: Automobile	0.189	50	PHL	27: Basic metals	0.857
10	MYS	19: Leather	0.194	50	IDN	34: Automobile	0.866
10	PHL	28: Fabricated metals	0.197	50	PHL	36: Furniture	0.903
10	PHL	26: Non-metallic	0.202	50	PHL	33: Precisions	0.905
25	PHL	19: Leather	0.211	50	MYS	17: Textiles	0.907
25	SGP	20: Wood	0.217	50	PHL	34: Automobile	0.998
25	VNM	35: Oth. transport	0.229	50	MYS	18: Apparel	1.028
25	MYS	22: Printing	0.233	50	SGP	18: Apparel	1.094
25	VNM	33: Precisions	0.247	50	THA	26: Non-metallic	1.111
25	PHL	25: Rubber/plastic	0.283	50	SGP	17: Textiles	1.125
25	PHL	35: Oth. transport	0.283	50	IDN	29: Machinery	1.175
25	VNM	20: Wood	0.323	50	VNM	31: Elect. machines	1.231
25	SGP	19: Leather	0.334	50	MYS	28: Fabricated metals	1.249
25	VNM	28: Fabricated metals	0.358	50	IDN	25: Rubber/plastic	1.254
25	IDN	33: Precisions	0.36	50	VNM	16: Tobacco	1.297
25	MYS	21: Paper	0.361	50	THA	35: Oth. transport	1.342
25	VNM	26: Non-metallic	0.376	50	MYS	35: Oth. transport	1.349
25	PHL	17: Textiles	0.383	50	VNM	17: Textiles	1.407
25	THA	22: Printing	0.411	50	SGP	25: Rubber/plastic	1.47
25	SGP	26: Non-metallic	0.422	50	IDN	30: Office	1.546
25	VNM	24: Chemicals	0.437	50	PHL	15: Food	1.553
25	PHL	20: Wood	0.448	50	THA	19: Leather	1.58
25	PHL	23: Petroleum	0.474	50	SGP	34: Automobile	1.598
50	MYS	34: Automobile	0.479	50	SGP	28: Fabricated metals	1.631
50	PHL	24: Chemicals	0.494	50	THA	28: Fabricated metals	1.695
50	VNM	25: Rubber/plastic	0.537	50	THA	33: Precisions	1.718
50	SGP	21: Paper	0.549	50	IDN	19: Leather	1.737
50	SGP	16: Tobacco	0.55	50	SGP	36: Furniture	1.765
50	VNM	27: Basic metals	0.55	50	SGP	22: Printing	1.797
50	IDN	31: Elect. machines	1.8	75	IDN	27: Basic metals	3.635
50	IDN	23: Petroleum	1.84	75	MYS	29: Machinery	3.638
50	PHL	31: Elect. machines	1.87	75	IDN	24: Chemicals	3.673
50	VNM	36: Furniture	2.014	75	MYS	23: Petroleum	3.691
50	PHL	18: Apparel	2.133	75	SGP	27: Basic metals	3.769
50	IDN	36: Furniture	2.271	75	THA	31: Elect. machines	4.086
50	SGP	15: Food	2.349	75	THA	36: Furniture	4.095

Continued on next page

Table 2.16 – continued from previous page

Quantile	Country	Industry	Exports	Quantile	Country	Industry	Exports
50	THA	17: Textiles	2.372	75	SGP	33: Precisions	4.854
50	IDN	21: Paper	2.379	75	THA	34: Automobile	5.059
50	MYS	33: Precisions	2.437	75	THA	29: Machinery	5.478
50	MYS	27: Basic metals	2.516	75	THA	24: Chemicals	5.536
50	THA	18: Apparel	2.629	75	MYS	24: Chemicals	5.792
50	THA	27: Basic metals	2.663	75	SGP	31: Elect. machines	6.641
50	THA	23: Petroleum	2.735	75	PHL	30: Office	6.681
50	MYS	36: Furniture	2.848	90	IDN	15: Food	6.814
50	MYS	20: Wood	2.856	90	MYS	15: Food	7.523
50	VNM	19: Leather	2.889	90	THA	30: Office	9.103
50	MYS	25: Rubber/plastic	3.103	90	THA	15: Food	10.4
50	IDN	17: Textiles	3.132	90	THA	32: Radio	10.4
50	THA	25: Rubber/plastic	3.205	90	SGP	29: Machinery	12.1
50	SGP	35: Oth. transport	3.254	90	PHL	32: Radio	12.5
75	IDN	32: Radio	3.275	90	MYS	30: Office	16
75	IDN	20: Wood	3.309	90	SGP	24: Chemicals	17.4
75	VNM	15: Food	3.394	90	SGP	23: Petroleum	20.2
75	IDN	18: Apparel	3.515	90	SGP	30: Office	24.2
75	MYS	31: Elect. machines	3.551	90	MYS	32: Radio	29.3
75	VNM	18: Apparel	3.625	90	SGP	32: Radio	47.8

Source: Author's compilation from UN-Comtrade database, data downloaded from WITS.

Table 2.14 – Summary Statistics: Export Performance Regressions

Whole Dataset	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Obs.**
I: $\ln X^s_{it}$	13.66	1.77	5.22	18.4	2196
II: $\ln FMA^s_{it}$	14.39	3.15	2.27	24.88	2274
III: $\ln w^s_{it}$	-6.12	3.24	-13.05	-1.76	1214
IV: $\ln l^s_{it}$	10.56	1.44	6.18	13.5	1304
V: $\ln FDI^s_{it}$	8.65	1.69	2.49	17.09	1215
VI: $\ln ER_{it}$	4.42	0.38	3.09	4.84	2274
VII: $\ln Corrup^s_{it}$	0.93	0.45	-1.11	1.5	2046
Quantile = 0.25					
I: $\ln X^s_{it}$	11.36	1.19	5.22	12.59	549
II: $\ln FMA^s_{it}$	12.25	2.76	2.27	17.9	549
III: $\ln w^s_{it}$	-6.95	3.01	-13.05	-2.32	270
IV: $\ln l^s_{it}$	10.02	1.22	6.72	12.75	323
V: $\ln FDI^s_{it}$	7.88	1.69	2.49	12.49	303
VI: $\ln ER_{it}$	4.38	0.42	3.09	4.84	549
VII: $\ln Corrup_{it}$	2.1	0.31	0	2.4	516
Quantile = 0.50					
I: $\ln X^s_{it}$	13.22	0.35	12.59	13.81	549
II: $\ln FMA^s_{it}$	14.48	2.24	5.08	24.72	549
III: $\ln w^s_{it}$	-5.99	3.11	-12.19	-1.78	320
IV: $\ln l^s_{it}$	10.36	1.29	6.62	12.73	340
V: $\ln FDI^s_{it}$	8.93	1.4	6.05	17.09	319
VI: $\ln ER_{it}$	4.39	0.4	3.09	4.84	549
VII: $\ln Corrup_{it}$	2.1	0.32	0	2.4	508
Quantile = 0.75					
I: $\ln X^s_{it}$	14.3	0.29	13.81	14.78	549
II: $\ln FMA^s_{it}$	15.27	2.68	7.79	24.88	549
III: $\ln w^s_{it}$	-5.55	3.39	-12.99	-1.76	334
IV: $\ln l^s_{it}$	10.74	1.51	7.18	13.32	346
V: $\ln FDI^s_{it}$	8.76	1.59	4.19	14.7	320
VI: $\ln ER_{it}$	4.43	0.38	3.09	4.84	549
VII: $\ln Corrup_{it}$	2.16	0.25	0	2.4	500

Table 2.15 – Matrix of Correlation: Export Performance Regressions (Pooled Dataset)

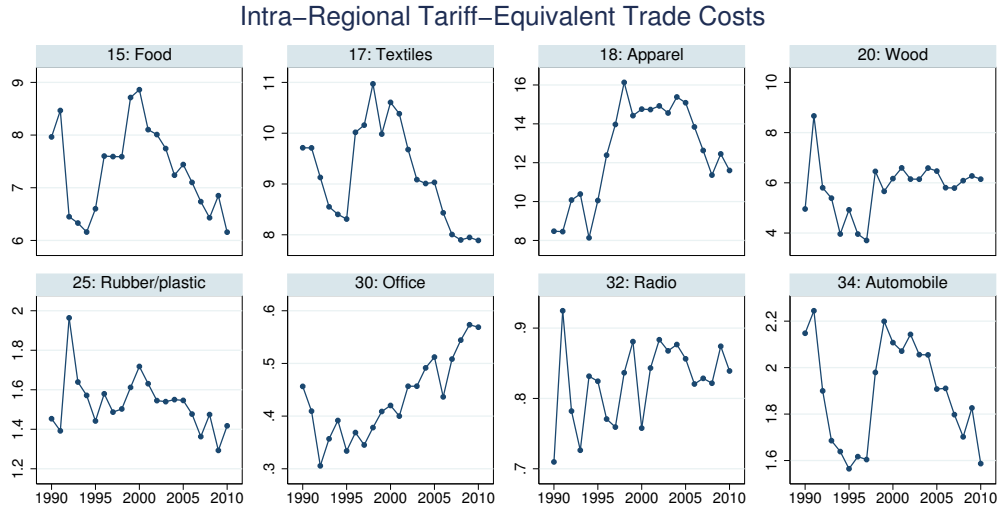
Overall Dataset	I	II	III	IV	V	VI	VII
I: $\ln X^s_{it}$	1.00						
II: $\ln FMA^s_{it}$	0.57	1.00					
III: $\ln w^s_{it}$	-0.11	-0.61	1.00				
IV: $\ln l^s_{it}$	0.16	0.71	-0.84	1.00			
V: $\ln FDI^s_{it}$	0.27	-0.35	0.42	-0.39	1.00		
VI: $\ln ER_{it}$	0.34	0.50	-0.30	0.22	-0.40	1.00	
VII: $\ln Corrup_{it}$	0.12	0.18	-0.03	0.20	-0.17	-0.02	1.00

2.A.3 Further Results

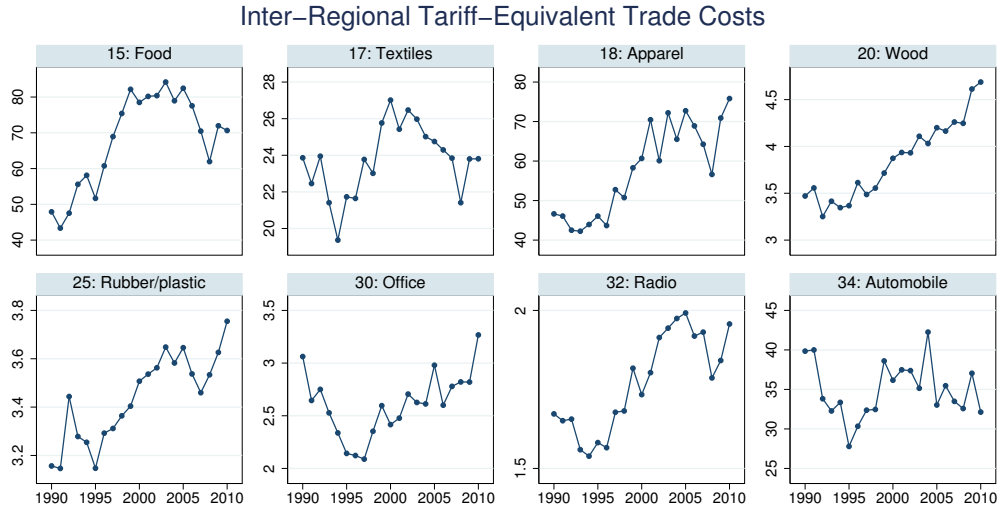
Table 2.17 – Percent change in Intra-Regional Tariff-Equivalent Trade Cost

Country	1990-2010	2000-2010
Indonesia	-4.8	-11.8
Malaysia	-9.8	-10.5
Philippines	2.1	-4.3
Singapore	-8.5	-16.1
Thailand	-26.4	-6.3
Vietnam	-36.3	-6.2

Figure 2.5 – Degree of Integration in the ASEAN's Priority Sectors Involving Manufacturing Goods



Author's own calculation based on median value of Novy index across combinations of country pairs



Author's own calculation based on median value of Novy index across combinations of country pairs

Chapter 3

Regional Integration and Inequality in per Capita Income

Abstract

Vast income disparities and their persistence are one of the salient features of ASEAN regional integration. The main motivation of this chapter is to address income disparities in ASEAN through the lens of the new economic geography (NEG) framework and to provide some empirical evidence as to why income levels are reluctant to converge. In particular, I estimate the impact of market access using a structural equation of the NEG model, per capita income in ASEAN between 1990-2009, and ASEAN's bilateral trade in manufactures over the same period. My results comply with all robustness tests shedding light on the significant role of market access in shaping income disparities. Market access alone accounts for 47% of variation in per capita income in ASEAN and an improved access to international markets by 10% is predicted to raise per capita income by about 6% on average in the preferred specification.

3.1 Introduction and Literature Review

We have seen in the previous chapter the benefit of trade integration on export performance through improved market access which suggests the prospect for the ASEAN countries in lowering trade barriers. I now turn to address the counter impact of this integration benefit, arguing that deepening integration can be associated with growing regional inequalities as the countries' market access improves.

The analysis in this chapter is inspired by the stylized fact that, despite increasing regional integration which tends to favor mobility of goods and productive factors across the integrated space, economic activities do not seem to be evenly distributed throughout the region. In fact, income distribution across ASEAN displays a core-periphery pattern, with the core countries experiencing higher per capita income (e.g., Singapore, Brunei Darussalam, Malaysia, and Thailand) and the periphery countries with lower per capita income (e.g., Myanmar, Cambodia, Lao PDR). This regional inequalities are reflected by relatively high value of Gini index of per capita GDPs, which amounted to 70% with zero corresponds to perfect equality (UNESCAP, 2010).[1] In addition, there is empirical evidence suggesting persistence of income gaps between the high- and the low-income members (Masron and Yusop, 2008), shedding light on the challenge that ASEAN should overcome in order to assure harmonious process of the integration.

The analysis in this chapter addresses the issue of spatial inequality of income levels in ASEAN through the lens of new economic geography (NEG). It complements the arguments on regional inequalities that have been advanced in the literature, such as differences in resource endowment (Gallup *et al.*, 1999), technology (Lim and McAleer, 2004), institutional quality (Rodrik *et al.*, 2004), or a country's transport costs (Limao and Venables, 2001).

In particular, I consider the channel of proximity to consumers, as represented by the country's market access. My empirical workhorse is the NEG "wage equation" (Fujita *et al.*, 1999) which models nominal wages as a function of a location's market access and where wages are predicted to be higher at the economic center and lower at the periphery. The equation postulates that,

1. This value is also high compared with other regional integration groups, such as 30% for the EU (Eurostat database on living conditions and welfare, 2010), or 36% for NAFTA and 28% for MERCOSUR (Blizkovsky, 2012).

since locations closer to consumer markets enjoy lower trade costs, firms located in these locations can afford to pay higher wages due to higher perspective of profit.

Redding and Venables (2004a) suggest empirical methodology to investigate the relevance of the wage equation in explaining cross-country variation of income. They find a striking outcome indicating that market access alone accounts for 35% of worldwide variation in GDP per capita. Another astonishing result is given by hypothetical experiments on locating remote developing countries, such as Sri Lanka and Zimbabwe, at the heart of Europe; the resulting improvement in market access would increase their GDPs per capita by about 70 to 80%, other things being equal.

Recent empirical applications of Redding and Venables (2004)'s methodology have confirmed the impact of proximity to markets on nominal wages at various geographical units, such as at regional level (Breinlich, 2006; Head and Mayer, 2006), state or provincial level (Knaap, 2006; Hering and Poncet, 2010; Fally *et al.*, 2010), and country or district level (Hanson, 2005; Amiti and Cameron, 2007). The focal interest of these works is to prove the consistency of spatial wage structure as one moves to a smaller geographical aggregation and investigate how the impact on nominal wage changes.

Hanson (2005) is the pioneer in this direction by investigating access to good markets across U.S. counties. His findings, although obtained from a different estimation method than that of Redding and Venables (2004), provide that the market-access hypothesis is consistent; higher nominal wage in a given country is positively determined by higher consumer purchasing power in nearby counties.

Head and Mayer (2006) and Breinlich (2006) also find the expected role of market access when looking at nominal wages at industry level across European regions. In particular, Head and Mayer additionally investigate adjustment mechanism of geographical variation of demand, whether it takes place through variation in quantities (employment) or prices (wage level).[2] They also stress

2. The quantity adjustment mechanism argues that higher demand increases production more than proportionally in the central location, giving rise to the so-called home market effect. The price adjustment mechanism posits that factor prices, and hence wage, tend to be higher there. Head and Mayer (2006) show that price and quantity aspects are interdependent and investigate whether high demand leads to higher wages, higher employment or both. Results reveal that wage is more sensitive to variation in demand compared with employment, shedding light on the difficulty that earlier studies have had in finding empirical evidence of

the importance of controlling for workers' skills and propose a human-capital augmented version of the wage equation. As workers with higher skills are likely to be attracted to live in big cities, not accounting for skills runs the risk of over attributing wage disparities to economic geography factors. The works applying individual data, such as Hering and Poncet (2010) and Fally *et al.* (2010) still obtain strong correlation between market access and wage differences even after controlling for individual characteristics.

While the above contributions examine the mechanism of access to consumers as a source of spatial distribution of income, Amiti and Cameron (2007) look at the role of firms' access to input/output markets or inter-firm linkages. Using firm-level data from the Indonesian manufacturing census, they estimate agglomeration benefits arise from cost and demand linkages between upstream and downstream firms and find their effect on firm wages to be important: firms situated in the location with best market access can afford to pay more than 20% higher wages paid in other locations.

Although most of the recent studies applying the wage equation have been focusing on regional data, there is still some space for country-level analysis to develop. Head and Mayer (2011) find that market access matters for long-run economic development when investigating worldwide GDP per capita over four-decade period. Bosker and Garretsen (2010) also find the role of market access when focusing on a sample of countries in sub-Saharan Africa. Their study is of particular interest because it sheds light on how the region's geographical disadvantage, defined by some apparent characteristics, such as landlockness, poor infrastructure, or political conflicts, can affect the region's poor economic performance.

All in all, results of these studies lead us to a well-established conclusion on the applicability of the wage equation to the real data, which emphasizes the role of proximity to demand, or market access, in shaping differences in income observed between regions.

As far as the analysis in this chapter is concerned, I first construct a market access index for each of the ASEAN countries and for the period between 1990-2009 using results obtained from the gravity model of ASEAN manufacturing trade. In particular, I closely follow Bosker and Garretsen (2012) to specify and estimate the gravity equation such that it is possible to use the estimates

home market effect.

to construct the market access index even when trade data are not available in some years. This strategy is useful as missing data are common issues for some ASEAN countries. I also distinguish between intra- and inter-regional market access to investigate the contribution of each component on variation in income.

The remainder of the chapter is organized as follows. The next section sets out theoretical NEG model underlying my empirical analysis, focusing on the specification of the wage equation and the trade gravity equation. Section 3.3 discusses estimation issues related to the application of the wage equation in panel data approach (control variables and potential endogeneity problem) and describes the required data. Section 3.4 explains how market access can be inferred from trade flows involving at least one ASEAN trade country while also shedding light on how the ASEAN manufacturing trade has shaped market access of each member country. Section 3.5 presents formal results of the wage equation with respect to the impact of market access along with results of the robustness checks. Section 3.6 provides an outlook on the magnitude of economic geography on income by performing some experiments on spatial adjustment of income per capita after exogenous economic and policy shocks to market access. Section 3.7 concludes.

3.2 Theory: Linking Market Access to the Wage Equation

This section presents the development of the structural wage equation where theoretical setting is the same as that in Chapter 2, i.e., the Dixit-Stiglitz-Krugman trade model in monopolistic competition. The only differences are that the analysis in this chapter moves to the country level and the spatial wage structure is derived from producer's maximization of profit. Therefore, we need to account for the supply conditions in addition to what has been modeled previously.

Let us briefly remind the theoretical setting as the following that in such a multi-country economy, firms operate under increasing returns to scale and produce differentiated manufactured products that are consumed as final and intermediate goods. Consumers combine each firm's product variety in a CES

utility function which increases with the number of varieties produced with σ, ($\sigma > 1$) being the constant elasticity of substitution between any pairs of product varieties.

The final demand for goods in country j is derived from the maximization of a representative consumer's CES utility function. Country j's demand for a variety produced in country i is

$$q_{ij} = p_{ij}^{-\sigma} Y_j P_j^{\sigma-1} \,, \tag{3.1}$$

where Y_j is location j's total expenditure on manufactured goods, p_{ij} is the traded (c.i.f) price of varieties produced in country i sold in importing country j. The traded price is the product of mill (f.o.b) price p_i and international transportation costs τ_{ij} between the two locations: $p_{ij} = p_i \tau_{ij}$. P_j is the aggregate CES price index for manufactured goods, $P_j = \left[\sum_{i=1}^{R} n_i p_{ij}^{1-\sigma}\right]^{\frac{1}{1-\sigma}}$, with n_i being the number of firms operating in country i. The CES price index does not only reflect the price level alone but also the degree of competition that crowds out firms from the local market. Intuitively, the higher the number of competitors, the lower is the price index which will in turn reduce the attractiveness of country j for additional firms to export there.

Taking into account the transport costs, the effective demand of the Eq. 3.1, addressed to a firm in i by country j is given by:

$$\begin{aligned} x_{ij} &= \tau_{ij} p_{ij}^{-\sigma} P_j^{\sigma-1} Y_j \\ &= \tau_{ij}^{1-\sigma} p_j^{-\sigma} P_j^{\sigma-1} Y_j \,, \end{aligned} \tag{3.2}$$

with σ being the price elasticity of demand. The Eq. 3.2 highlights that trade costs influence demand more when the elasticity of substitution is high, that is, when a good is not specific as one variety can easily replace another similar varieties. I follow the literature in referring to $\tau_{ij}^{1-\sigma} = \phi_{ij}$ as freeness of trade or "phi-ness" (Baldwin *et al.*, 2003), with value ranging from zero when trade costs are prohibitive, or to one when trade costs are negligible.

Given the effective demand x_{ij}, the number of firms in exporting country n_i, and the mill price there p_i, the value of bilateral export is expressed as:

$$n_i p_i x_{ij} = n_i p_i^{1-\sigma} \phi_{ij} P_j^{\sigma-1} Y_j \,, \tag{3.3}$$

which provides the basis for the theoretical trade gravity equation. As Redding and Venables (2003) emphasize it, the last term of the right hand-side reflects market capacity of the importing country j, denoted by $mc_j = P_j^{\sigma-1}Y_j$, whereas the first term, $n_i p_i^{1-\sigma}$, is referred to as the *supply capacity* of the exporting country, denoted by $sc_i = n_i p_i^{1-\sigma}$.

Turning to the supply side to determine optimum mill price, I follow the standard assumptions of the model. Manufacturing firms operate under internal increasing returns that emerge from the combination of fixed costs, F_i, and a marginal cost, m_i. The cost of producing q_i in each country is assumed to take the form $m_i q_i + F_i$. Each firm maximizes its gross profit Π_i, which is a sum of the overall profits of country i in each market j, $\pi_{ij} = (p_i - c_i)\tau_{ij}q_{ij}$. The resulting mill price for each origin i is a simple markup over marginal costs:

$$p_i = m_i \frac{\sigma}{\sigma - 1} \,. \tag{3.4}$$

In a model with homogeneous agents as such, all varieties produced in a given country i are charged the same price before transport costs. The gross profit earned in each market j for a variety produced in country i is given by $\pi_{ij} = p_i x_{ij}/\sigma$. Substituting mill price by its expression, summing up the profits earned in all markets, and subtracting the fixed costs, F_i, the net profit in each potential production location i writes

$$\Pi_i = \sum_j p_r x_{rj}/\sigma - F_r = \frac{1}{\sigma} c_r^{1-\sigma} \sum_j \left[\phi_{ij} P_j^{\sigma-1} Y_j\right] - F_r \,, \tag{3.5}$$

with the notation in the literature:

$$\sum_j \phi_{ij} P_j^{\sigma-1} Y_j = \sum_j \phi_{ij} mc_j = MA_i \,, \tag{3.6}$$

which stands for "market access" of country i. It is simply the sum of market capacities (or purchasing power) of all destinations j, mc_j, weighted by the measure of bilateral trade freeness between i and j, ϕ_{ij}.

I follow Head and Mayer (2006) in introducing worker heterogeneity into the standard Dixit-Stiglitz-Krugman model, assuming that labor is the only production input, and positing that firm require both a fixed α and a variable β component of labor. Apart from notation and the inclusion of labor force

characteristics, we obtain what Fujita *et al.* (1999) (p.53) termed as the *wage equation*:

$$\begin{aligned} w_i &= \left[\sum_j \phi_{ij} P_j^{\sigma-1} Y_j \frac{\beta^{1-\sigma}}{\sigma\alpha}\right]^{1/\sigma} \exp(\rho z_i) \\ &= \left[MA_i \frac{\beta^{1-\sigma}}{\sigma\alpha}\right]^{1/\sigma} \exp(\rho z_i)\,, \end{aligned} \tag{3.7}$$

with z corresponding to worker i characteristics and ρ to their returns in terms of wages. [3] The central variable in the analysis is once again the market access, MA_i. Note now that high values of MA_i clearly lead to high wages, which reflects the agglomeration mechanisms linked to the size of the final markets. Therefore, trade costs are of vital importance in determining the spatial distribution of the income because the lower trade costs, the easier access to consumer markets, the higher the wages that firms can offer their workers to remain profitable.

3.3 Empirical Issues

3.3.1 Estimating the Wage Equation

First, estimating the wage equation defined in the Eq. 3.7 requires the knowledge of market access. As neither market access nor its components, i.e., market capacity mc_j and bilateral trade costs ϕ_{ij}, are directly observable, I adopt Redding and Venables (2004)'s two-step procedure, in which the first consists in estimating bilateral trade equation in the gravity style and using resulting coefficients to construct market access index. The second step then use the constructed market access index as explanatory variable in the wage equation. Another possible estimating strategy is to directly apply non-linear estimator to the wage equation as in Hanson (2005); Amiti and Cameron (2007). Yet, the two-step procedure has the advantage of considering the effect of proximity to import demand and export supply from the gravity, thereby allowing both consumers and firms to be sources of manufacturing demand.

Second, the measure of wage in my analysis can vary across countries due to

3. In the empirical section, I will proxy z with information on qualification of labor force. ρ is therefore the percentage increase in wage from additional qualified labor.

worker abilities which differ between locations. These abilities can be influenced by some unobserved country characteristics that are constant over the period of analysis, such as labor regulations or the presence of universities. Not controlling for these omitted variables can run the risk of endogeneity arising from the correlation between these unobserved heterogeneities and the error term. I remove them by introducing country-fixed effects to the baseline regression.

The third issue concerns robustness tests of my results. As there may be other sources beside market access that influence wage level in particular variables affecting the quality of a country's human resource, omitting these variables might over quantify the effect of market access. To see how they might affect the estimation, I include some control variables to account for supplies of human capital as suggest by (Head and Mayer, 2006). To the extent of data availability for the ASEAN countries, these variables are the level of education (Head and Mayer, 2006, 2011; Bosker and Garretsen, 2010) and female participation that is to the disadvantage of female employees (Amiti and Cameron, 2007; Hering and Poncet, 2010). Another problem relates to the potential endogeneity that arises from reverse causal relationship between income level and market access. Here, income can enter on both sides of the equation as a country with high income may display higher demand for both local and foreign products, and hence raise its own market access. This problem is addressed by using the instrumental variable technique in panel data approach.

The last issues concerns biased standard errors caused by the two-step estimation procedure. As the main regressor, which is market access, is generated from parameters that are themselves estimated with errors in the first-step regression, the stochastic error of the wage equation includes residuals from the trade gravity which we must correct for. I follow Redding and Venables (2004a) (p. 64) to remedy this issue by boostrap techniques to obtain standard errors that explicitly take into account the presence of generated regressors.

3.3.2 Dataset

In the first-step estimation, I use bilateral exports of total manufacturing goods as dependent variable of the gravity equation. These flows are aggregates of 22 sectors at two-digit ISIC Rev. 3 taken for the period between 1990-2009 from UN-Comtrade database Taking into account manufacturing trade flows

involving at least one ASEAN country (as exporter or importer), I focus on a set of partner countries that include 135 export countries and 150 import countries (see list of countries in the Appendix). The final sample accounts for 29,421 observations, out of which 128 are domestic flows (for ASEAN countries only), 1,086 are within the ASEAN region, and 28,207 are between ASEAN and the rest of the world.

As for the data on determinants of ASEAN trade related to market and supplier capacity specified in the gravity equation, GDP and variables constituting infrastructure quality (road, paved road, rail and telephone lines) are obtained from the World Bank's WDI. Some missing GDP and infrastructure observations for the ASEAN and the Asia-Pacific countries are completed by statistics from UNESCAP's Asia-Pacific database. [4] [5] As for data on geographical features and list of RTAs, they come respectively from CEPII and the WTO's RTA database. The list of RTAs concluded with the ASEAN is provided in the Appendix.

Estimating the wage equation requires data on national income of the 10 ASEAN countries which is proxy by per capita GDP. As for control variables for human capital, cross-country labor ablility is measured by gross enrollment in tertiary education (%) [6] and participation of female workforce by the share of female employees in total employment. However, including these variables reduces significantly the number of observations in the dataset due to some missing observations on these control variables.

Data on GDP per capita and employment of the ten ASEAN countries come from UN-ESCAP whereas education data are obtained from the World Bank.

4. Afghanistan, Brunei Darussalam, Hong Kong, Iran, Cambodia, Lao PDR, Macao, Myanmar, New Caledonia, People's Republic of Korea, and French Polynesia.

5. http://www.unescap.org/stat/data/statdb/DataExplorer.aspx. This database assembles statistics of the Asia-Pacific countries from international sources such as World Bank or UNDP. Missing observations are sometimes computed by the UNESCAP, providing that the database contains quite complete and long series of macroeconomic indicators for ASEAN since the 1960s.

6. Alternatively, Head and Mayer (2006, 2011); Hering and Poncet (2010) use total years of schooling (from primary to tertiary) as measure to control for skills but this variable has more missing values for the ASEAN countries.

3.4 Inferring Market Access

I begin the empirical analysis with the estimation of bilateral trade equation in gravity style. The idea is to use resulting coefficients to calculate bilateral trade freeness (ϕ_{ijt}) and market capacity which are the main ingredients in constructing a market access index for each ASEAN country. Regarding my estimation strategy, it is worth mentioning two features which differ from the standard gravity procedure.

First, I have specified the gravity equation such that it is possible to use the estimating results to compute market access for all the ASEAN countries even in the absence of bilateral trade flows. Specifically, I do not implement the common practice in the literature, which is to include country fixed effects and use these as estimates of market capacity (mc_j) and supplier capacity (sc_i) (Anderson and van Wincoop, 2004; Redding and Venables, 2004a). Applying this strategy to ASEAN's manufacturing trade is limited by the considerable amount of missing data, leaving me unable to identify the importer and exporter fixed effects if trade flows are missing; and in this case, I would omit nearly half of the ASEAN members and a number of partner countries in some years when constructing the market access index. [7] To overcome his problem, I have estimated the gravity equation by explicitly replacing country dummies by country-specific determinants of market and supplier capacity for which I have full observations for all ASEAN and partner countries. Then using the obtained coefficients on these determinants, I can construct the market access index for each of the ASEAN countries even if trade flows are not available. Moreover, opting for country-specific determinants allows us to quantify the effect on wage of particular geographical features, such as landlockness, infrastructure quality, as these effects are not contained in the dummies (Redding and Venables, 2004, p.75). The second distinction concerns the estimation method of the gravity which is done in panel data approach. I assume country-pair (bilateral) specific effects and implement the Hausman-Taylor instrumental variables estimation (HT-IV) as first applied to the gravity equation by Carrère (2006). This estimator allows me to obtain coefficients of time-invariant components of trade

7. For example, Lao PDR is the only ASEAN country that has never reported manufacturing export statistics during the period of analysis, whereas Myanmar has done so for five years.

costs while also controlling for potential endogenous regressors in the model. [8] [9]

In the following, I first present the specification of the gravity model of ASEAN's manufacturing trade along with its estimation results. I then explain the construction of the market access index and how ASEAN's manufacturing trade has shaped market access value of each member country.

3.4.1 The Gravity Model of ASEAN's Manufacturing Trade

The gravity equation is derived by taking the natural logarithm of the Eq. (3.3), assuming that supply capacity (sc_i) and market capacity (mc_j) are determined respectively by GDP of exporter and importer, and allowing for year-specific effects as well as bilateral specific effects. Specifically,

$$\ln(X_{ijt} = sc_{it}\phi_{ijt}mc_{jt}) = \alpha_0 + \alpha_t + \beta \ln gdp_{it} + \delta \ln \phi_{ijt} + \gamma \ln gdp_{jt} + \mu_{ij} + \nu_{ijt}\,. \tag{3.8}$$

where trade cost (ϕ_{ijt}) is assumed to be a multiplicative function of country-pair and country-specific characteristics, namely, distance ($dist_{ij}$), contiguity ($CONTIG_{ij}$), common language ($LANG_{ij}$), common colonial experience $\Big($both colonizer-colony relationship (COL_{ij}) and common colonizer ($COMCOL_{ij}$)$\Big)$, common membership in bilateral or regional trade agreements (RTA_{ijt}), the ASEAN Free Trade Area ($AFTA_{ijt}$), landlockedness ($LOCK_{i(j)}$), and island country ($ISL_{i(j)}$). I also include an index for infrastructure quality ($infra_{i(j)t}$) as in Limao and Venables (2001) and Carrère and Grigoriou (2008), with higher values indicating better infrastructure quality. [10] Thus, the multiplicative trade freeness function is given by:

8. The HT-IV estimator is implemented in Stata by *xthtaylor* command (see Chapter 9 in Cameron and Trivedi (2009)). It combines both between and within variation of the strictly exogenous variables as instruments for the time-invariant variables that are correlated with the bilateral fixed effects.

9. Alternative estimation methods have been adopted to address zero-trade issue. Among the most frequently applied are the Pseudo-Poisson Maximum Likelihood (Silva and Tenreyro, 2006) or the Hechman 2-step estimator (Helpman *et al.*, 2008; Bosker and Garretsen, 2012).

10. Given the construction of the index, I use $1 + infra_{i(j)t}$ in the estimated equation so that it is possible to take log when the value of $infra_{i(j)t}$ is close to zero.

$$\phi_{ijt} = dist_{ij}^{\delta_1}(1+infra_{it})^{\delta_2}(1+infra_{jt})^{\delta_3}\mathrm{e}^{(\delta_4 CONTIG_{ij}+\delta_5 LANG_{ij}+\delta_6 COL_{ij}+\delta_7 COMCOL_{ij})} \mathrm{e}^{(\delta_8 RTA_{ijt}+\delta_9 AFTA_{ijt}+\delta_{10} LOCK_i+\delta_{11} LOCK_j+\delta_{12} ISL_i+\delta_{13} ISL_j)}, \quad (3.9)$$

Replacing bilateral trade cost (ϕ_{ijt}) in Eq. (3.8) yields:

$$\begin{aligned}\ln X_{ijt} = {} & \alpha_0 + \alpha_t + \beta \ln gdp_{it} + \gamma \ln gdp_{jt} + \delta_1 \ln dist_{ij} + \delta_2 \ln(1+infra_{it}) \\ & + \delta_3 \ln(1+infra_{jt}) + \delta_4 CONTIG_{ij} + \delta_5 LANG_{ij} + \delta_6 COL_{ij} \\ & + \delta_7 COMCOL_{ij} + \delta_8 RTA_{ijt} + \delta_9 AFTA_{ijt} + \delta_{10} LOCK_i + \delta_{11} LOCK_j \\ & + \delta_{12} ISL_i + \delta_{13} ISL_j + \mu_{ij} + \nu_{ijt}\,. \end{aligned} \quad (3.10)$$

with the estimated coefficients of distance, landlockedness and island are expected to be negative whereas the remaining coefficients are expected to be positive. Results reported in Table 3.1 starting with column (1) assuming the bilateral effects as fixed which entails the Within estimator as unbiased estimator of the time-varying variables. Yet, the coefficients of time-invariant variables (e.g., geographical features) cannot be identified due to the within transformation of the model. I turn to consider the bilateral effects as random variables by implementing the Generalized Least Squares (GLS) as in column (2), which provides consistent estimates only if the specific effects are strictly exogenous, i.e., in the absence of the correlation with the explanatory variables. However, the Hausman test based on the difference between Within and GLS estimators strongly rejects this assumption. Adopting HT-IV as the preferred estimator is then justified providing that the GLS estimator is biased. Moreover, the HT-IV estimator can also control for potential endogeneity of regressors like GDP or infrastructure which are suspected to be correlated with bilateral fixed effect due to reverse causality [11].

Column (3) implements the HT-IV estimator considering these two variables as endogenous. The results point out that GDP and infrastructure are actually correlated with the bilateral specific effects as the Hausman test comparing HT-IV and GLS strongly rejects the null hypothesis of their exogeneity;

11. As exports are part of GDP meaning that countries that export more tend to have high GDP. On the other hand, an increasing amount of trade can bring incentives for countries to improve the quality of infrastructure and trade logistics.

Table 3.1 – Gravity Results of ASEAN Manufacturing Trade (1990-2009)

	(1)	(2)	(3)	(4)
Estimator	FE-Within	RE-GLS	HT-IV1[1]	HT-IV2[2]
$\ln gdp_{it}$	0.10	1.25^a	0.63^a	0.62^a
	(0.25)	(0.00)	(0.00)	(0.00)
$\ln gdp_{jt}$	0.76^a	0.91^a	0.88^a	0.87^a
	(0.00)	(0.00)	(0.00)	(0.00)
$\ln dist_{ij}$	-	-1.50^a	-1.32^a	-1.29^a
		(0.00)	(0.00)	(0.00)
$\ln(1+infra_{it})$	1.05^a	1.47^a	1.20^a	1.19^a
	(0.00)	(0.00)	(0.00)	(0.00)
$\ln(1+infra_{jt})$	0.38^c	0.77^a	0.47^a	0.46^a
	(0.06)	(0.00)	(0.02)	(0.02)
$CONTIG_{ij}$	-	0.48	1.50^c	1.59^c
		(0.16)	(0.08)	(0.06)
$LANG_{ij}$	-	0.84^a	1.00^a	1.01^a
		(0.00)	(0.07)	(0.07)
COL_{ij}	-	1.06^a	2.10^b	2.11^b
		(0.00)	(0.03)	(0.03)
$COMCOL_{ij}$	-	0.21	-0.56^c	-0.58^b
		(0.20)	(0.05)	(0.05)
RTA_{ijt}	-0.18^b	-0.09	-0.15	-0.16^c
	(0.05)	(0.28)	(0.12)	(0.09)
$AFTA_{ijt}$	0.44^a	0.44^a	0.43^a	0.41^a
	(0.00)	(0.00)	(0.00)	(0.00)
$LOCK_i$	-	-1.12^a	-2.09^a	-2.10^a
		(0.00)	(0.00)	(0.00)
$LOCK_j$	-	-0.71^a	-0.83^a	-0.83^a
		(0.00)	(0.00)	(0.00)
ISL_i	-	0.58^a	0.93^a	0.94^a
		(0.00)	(0.00)	(0.00)
ISL_j	-	-0.10	-0.04	-0.02
		(0.33)	(0.86)	(0.91)
Nb. of obs.	29,421	29,421	29,421	29,421
R^2	0.24	0.63	0.54	0.55
Hausman test:				
Within vs. GLS (Chi2(25))	-	1112^a	-	-
Endogeneity test (based on Hausman test)[3]				
HT vs. GLS (Chi2(34))	-	-	219^a	213^a
HT-IV2 vs. HT-IV1 (Chi-2(34))	-	-	-	11

Robust p-values in parentheses; ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

1. Endogenous variables = ln gdp_{it}, ln gdp_{jt}, ln(1+infra_{it}), ln(1+infra_{jt})

2. Endogenous variables = ln gdp_{it}, ln gdp_{jt}, ln(1+infra_{it}), ln(1+infra_{jt}), RTA_{ijt}, AFTA_{ijt}

3. All results of Hausman test include coefficients of time effects.

instrumentation has indeed improved the model. However, another source of endogeneity can come from the inclusion of RTA variable in the gravity as suggested by Baier and Bergstrand (2004, 2007). In fact, RTA and AFTA dummy variables are likely to be correlated with omitted variables involving the decision to trade, as for instance, a selection bias associated with the decision to form an RTA with countries that are from similar economic or political background.

The HT-IV estimation in column (4) additionally considers RTA and AFTA as endogenous, and the corresponding HT-IV vs. GLS test for this equation leads us to conclude once again that the model has been improved. However, when comparing the two HT-IV models in column (3) and (4), the result of the Hausman test is not in favor of the model with endogenous RTA variables. As a consequence, column (3) will be the preferred model that provides us with consistent estimates of trade costs to compute market access index. Before turning to the calculation of the index, we can draw some insights from the gravity regression as follows.

First, there is a trade-stimulating effect of exporter and importer economic size as both GDP have expected positive sign. The impact on imports is yet stronger than on exports; a large country will tend to see its manufacturing imports being slightly higher than its actual exports. Regarding the bilateral trade cost variables, I find the standard result that distance negatively affects the amount of trade between countries. Sharing a common land frontier, language similarity, and sharing colonial relationships also facilitate trade but interestingly these positive effects are reduced by having a common colonizer. The latter result reveals that manufacturing exports of the ASEAN countries compete with that of the other developing countries sharing common colonizers in the past. As for the coefficients of RTA and AFTA variables that are of particular interest, I do not find a significant impact of RTA, a result consistent with the fact that many of the RTAs in force during the period of analysis have only been concluded by a few ASEAN members (Singapore and Thailand) and many of the RTAs have only been recently in force since 2007 or 2008. Nonetheless, there I find a substantial positive evidence of AFTA which is predicted to increase regional by about 50 % (i.e. $(e^{0.4} - 1) \times 100$) [12]

12. In panel estimation of the gravity, Carrère (2006) has also found a positive effect of intra-ASEAN trade with the coefficient being 0.88 using HT-IV estimator, whereas Trotignon

Finally, concerning results of the remaining country-specific trade cost variables, I find that countries without maritime access face trade penalty either as an exporter or importer. This result confirms the difficulty of Lao PDR, the only landlocked country in ASEAN, in developing its manufacturing exports. However, in line with results by Limao and Venables (2001) for the case of African countries, being an island nation does not actually obstruct its export activities and the effect is not significant considering imports of the ASEAN island countries. Lastly, improved quality of infrastructure has positive effects on trade with the effect being more important on exporters.

3.4.2 Constructing the Market Access

In the following, using the MA expression in Eq. (3.6), the trade cost function in Eq. (3.9), and the estimated coefficients of trade costs provided in column (3) of Table 3.1, I compute a market access index for each of the 10 ASEAN countries and in each year during the sample period 1990-2009. A country's total market access is a sum of three components namely, domestic market access (MA_{it}^{dom}), ASEAN market access (MA_{it}^{sea}), and the rest of the world (ROW) market access (MA_{it}^{row}), according to whether trade occurs within a country, within the South-East Asian region, or between ASEAN and non-ASEAN countries, respectively:

$$MA_{it,i\in ASEAN}^{total} = MA_{it}^{dom} + MA_{it}^{sea} + MA_{it}^{row} \tag{3.11}$$

where

$$MA_{it}^{dom} = \widehat{gdp_{it}^{\gamma}}\, dist_{ii}^{\hat{\delta}_1}(1+infra_{jt})^{\hat{\delta}_2+\hat{\delta}_3}\, \mathrm{e}^{(\hat{\delta}_{10}+\hat{\delta}_{11})LOCK_j+(\hat{\delta}_{12}+\hat{\delta}_{13})ISL_j}$$

$$MA_{it}^{sea} = \sum_{j\in sea} \widehat{gdp_{jt}^{\gamma}}\, \widehat{dist_{ij}^{\delta_1}}(1+infra_{it})^{\widehat{\delta}_2}(1+infra_{jt})^{\widehat{\delta}_3}\, \mathrm{e}^{\widehat{\delta}_4 CONTIG_{ij}+\widehat{\delta}_5 LANG_{ij}}$$
$$\mathrm{e}^{\widehat{\delta}_7 COMCOL_{ij}+\widehat{\delta}_9 AFTA_{ijt}+\widehat{\delta}_{10} LOCK_i+\widehat{\delta}_{11} LOCK_j+\widehat{\delta}_{12} ISL_i+\widehat{\delta}_{13} ISL_j}$$

$$MA_{it}^{row} = \sum_{j\neq sea} \widehat{gdp_{jt}^{\gamma}}\, \widehat{dist_{ij}^{\delta_1}}(1+infra_{it})^{\widehat{\delta}_2}(1+infra_{jt})^{\widehat{\delta}_3}\, \mathrm{e}^{\widehat{\delta}_4 CONTIG_{ij}+\widehat{\delta}_5 LANG_{ij}}$$

(2010) has obtained 0.53 in his study using Within estimator.

$$e^{\widehat{\delta}_6 COL_{ij}+\widehat{\delta}_7 COMCOL_{ij}+\widehat{\delta}_8 RTA_{ijt}+\widehat{\delta}_{10} LOCK_i+\widehat{\delta}_{11} LOCK_j+\widehat{\delta}_{12} ISL_i+\widehat{\delta}_{13} ISL_j}. \quad (3.12)$$

Table 3.2 – Summary of the Computed Freeness of Trade and Market Access for the ASEAN countries

ϕ_{ij} $(\times 10^3)$	Observations	Mean	Std. Dev.	Min	Max
ϕ_{ijt}^{sea}	1,800	0.42	1.13	0.01	13.84
ϕ_{ijt}^{row}	53,000	0.01	0.03	0.000	0.65
ϕ_{iit}^{dom}	200	21.63	61.91	0.03	303.23
Market Access Indices: $MA_{it} = \sum_j gdp_{jt}^{\hat{\gamma}} \phi_{ijt}$					
$\text{MA}_{it}^{dom+sea+row}$	200	703.49	1,580.39	10.40	7,515.16
$\text{MA}_{it}^{dom+sea}$	200	548.99	1,510.24	3.12	7,051.08
MA_{it}^{row}	200	154.51	157.33	7.28	758.34
$\text{MA}_{it}^{sea+row}$	200	235.35	209.45	10.39	968.30
MA_{it}^{sea}	200	80.85	93.94	3.11	504.21
MA_{it}^{dom}	200	468.14	1,428.21	0.01	6,546.87

Table 3.2 summarizes the computed bilateral trade freeness (ϕ_{ijt}) at three border levels and resulting measures of market access. Results show that on average geographical obstacles to trade are the lowest for domestic markets as expected but they are becoming higher for intra-regional trade and inter-regional trade respectively. The higher intra-regional trade freeness index (ϕ_{ijt}^{sea}) comparing to that of inter-regional (ϕ_{ijt}^{row}) is owing substantially to the contribution from contiguity [13], common official or ethnic languages spoken [14], and the AFTA (cf. trade gravity results in Table 3.1).

When looking at components of the total market access, due to high domestic trade freeness (ϕ_{iit}^{dom}), the domestic component of market access (MA_{it}^{dom}) contributes primarily to the total market access. However, when considering foreign components alone, ROW market access (MA_{it}^{row}) is on average nearly

13. All the ASEAN countries except the Philippines share common land frontier with at least one member. Malaysia and Thailand have the highest contiguity: with Brunei Darussalam, Indonesia, Singapore, and Thailand are neighbors of Malaysia; whereas Cambodia, Lao PDR, Myanmar, and Malaysia are neighbors of Thailand.

14. English is officially spoken in Singapore and the Philippines, Malay is spoken in Malaysia, Brunei Darussalam, Indonesia, and partly in Singapore. Thailand and Lao PDR also share similar language.

Table 3.3 – Evolution of the Estimated Market Access, the share of Its Components, and GDP per capita

	Year	Ln MA (average)	$\%MA^{RoW}$	$\%MA^{sea}$	$\%\ MA^{dom}$	GDP per capita. (average)
		(1)	(2)	(3)	(4)	(5)
	1990	7.85	35.15	9.52	55.34	5104
	1995	8.92	17.77	10.15	72.08	5886
	2000	8.67	23.45	11.85	64.70	6193
	2005	9.08	22.21	11.78	66.01	6789
	2009	9.23	23.25	13.53	63.22	6854
% change	(1990-2009)	17.61	-33.85	42.21	14.24	34.3
% change	(p.a.)	1.97	-2.04	1.78	0.67	1.5

twice as much of the ASEAN market access (MA_{it}^{sea}) but this is due to the sum of GDPs in ROW markets.

Figure 3.1 illustrates in some more detail how trade distance influence market access by plotting each ASEAN country's MA index against distance to representative major markets, distinguishing between the ASEAN markets and the ROW markets. The correlation between the corresponding MA index and the bilateral distance is significant at ten percent level. The negative slope of the fitted lines indicates that the further countries are from major markets, the lower their market access values become. The plots reveal that distance is a penalty for access to markets in ASEAN and Japan.

Looking at cross-country levels of market access, Malaysia and Singapore have the best ASEAN market access thanks to advantage in terms of geographical centrality. On the other hand, the Philippines, who is the most remote ASEAN member, sees its ROW market access sharply higher than its ASEAN market access, suggesting its strong dependence on trade with ROW. Another interesting result concerns the fact that a landlocked country like Lao PDR has the worse market access for both intra- and inter-regional trade, a finding in line with those of Bosker and Garretsen (2010) for the case of sub-Saharan African countries and of Carrère and Grigoriou (2008) for the case of Central Asian countries.

It is also interesting to see how the market access index has evolved over time and whether it has experienced some specific trends during the period of

Figure 3.1 – Impact of Distance on Market Access (Log of Average Values between 1990-2009)

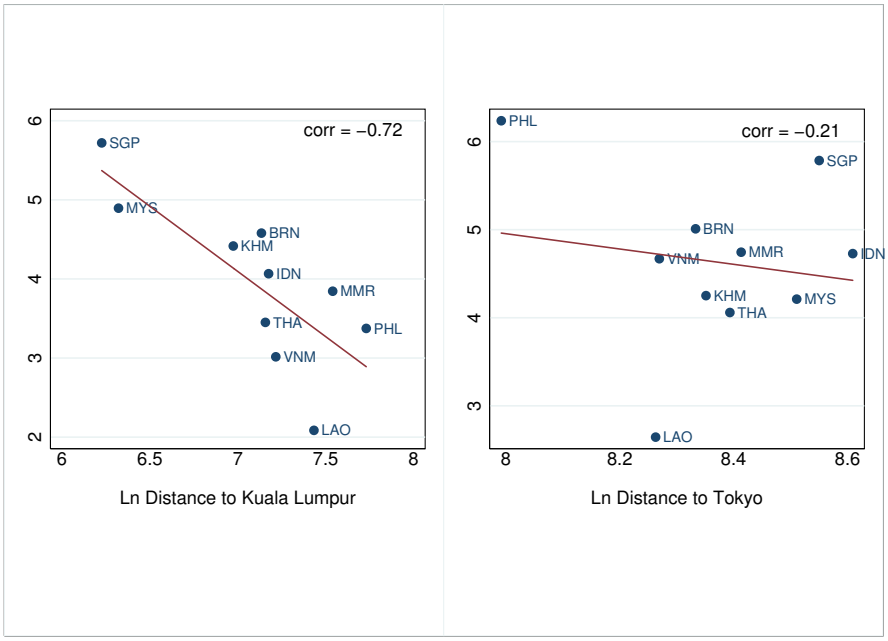
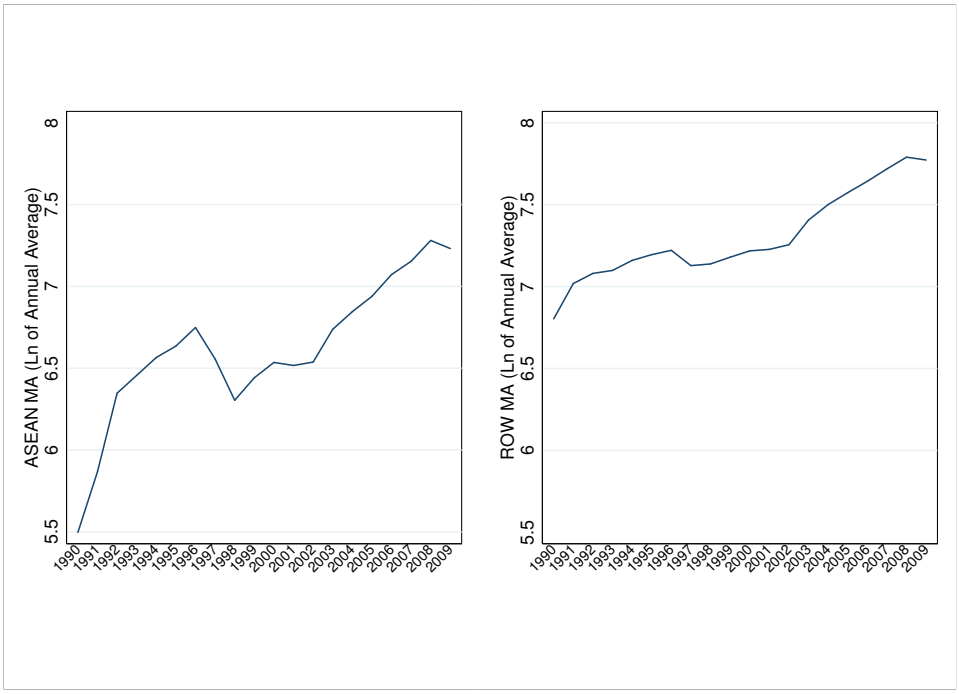


Figure 3.2 – Evolution of Intra- and Inter-Regional Market Access (1990-2009)



analysis. Figure 3.2 shows that market access in ASEAN and in the rest of the world has grown over time for ASEAN manufacturing goods, although there was a slight drop during the Asian financial crisis of 1997-1998 for the ASEAN market access. These evolutions illustrate ASEAN's increasing integration into world markets where market access value (in log) grows at 2% per year on average, expanding faster than ASEAN's average GDP per capita which grows at 1.5% per year (cf. the last row of columns (1) and (5) in Table 3.3).

Looking at the three components of market access, Table 3.3 shows that the ASEAN component has the smallest share in total market access compared with domestic and ROW components. Nonetheless, the contribution of ASEAN market access grows the fastest at the rate of 1.8% per year on average while the share of ROW market access shrinks by 2% annually. This evolution highlights the growing importance of intra-regional trade on ASEAN economic development and witnesses the progress that the ASEAN countries have made in liberalizing regional trade.

3.5 Empirical Results

3.5.1 The Relevance of Market Access in Shaping Economic Development in ASEAN

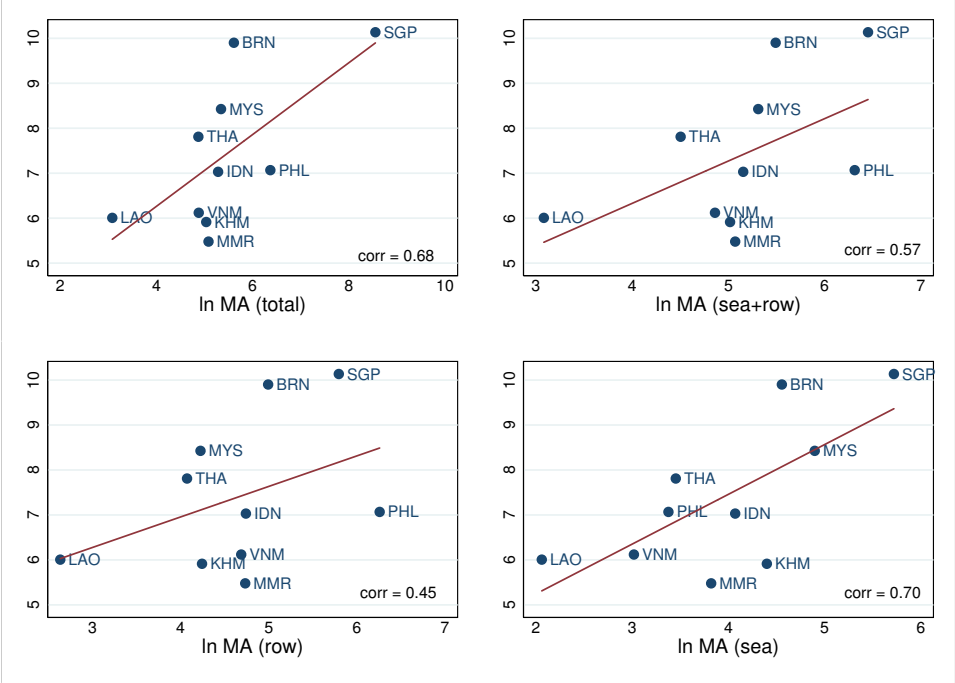
I first investigate the relationship between market access and GDP per capita by plotting the log of each country's average market access for the period 1990-2009 against the average of GDP per capita over the same period. As illustrated by Figure 3.3, there is a positive relationship between GDP per capita and all measures of market access with correlations varying between 0.5 and 0.7.

Turning to the estimation of the wage equation, taking the log of the Eq. (3.7), the following is our baseline estimating equation in panel data:

$$\ln w_{it} = \theta_0 + \theta_1 \ln \widehat{MA_{it}} + \eta_{it} \,. \tag{3.13}$$

In line with Redding and Venables (2004, p.63), I proxy wages (the price of the immobile factor of production) by GDP per capita and I assume for now that the error term η_{it} includes z_i which encapsulates characteristics of the

Figure 3.3 – GDP per Capita and Market Access (Log of Average Values between 1990-2009)



labor force in country i. I begin the estimation using pooled OLS to measure the cross-sectional relationship between wage and market access as in Redding and Venables (2004). The results are shown for various measures of market access in columns (1) to (5) in Table 3.4. All the estimated coefficients are positive and statistically significant at 1% level. A 1% increase of market access is predicted to raise GDP per capita by around 0.7 to 1.1% according to the measurement of market access. These results are consistent with that of the existing empirical work in panel data approach: Head and Mayer (2011) obtain the coefficient of total market access equals to 0.7 whereas my coefficient is 0.8; and considering only foreign component of market access, they find the coefficient being 0.9 against 1.0 in my case. Moreover, the total market access alone explains 46% of ASEAN-variation in GDP per capita or 32% if one takes into account only the foreign component of market access (cf. R^2 in columns (1) and (4), respectively). When considering separately the effect of ROW and ASEAN components of total market access (columns (2), (3) and (5)), the estimated coefficient on ASEAN market access is slightly higher than that of ROW market access, and also the ASEAN market access on its own explains the variation of GDP per capita more than the ROW market access does. All in all, preliminary results of the pooled models confirm the role of market access in shaping the pattern of economic development in ASEAN.

The assumption that idiosyncratic differences in countries' characteristics are uncorrelated with market access is likely to be violated in the pooled models because of unobserved country-specific characteristics that can have an influence on income level. I include country-level fixed effects in the following regressions to capture the effects of omitted nation-specific differences. I also introduce year-fixed effects, taking into account common shocks that affect all countries such as economic crisis or any technological changes [15]. Columns (6) to (10) of Table 3.4 present results with controls for country- and time-fixed effects. The inclusion of these fixed effects is important because the market access coefficients become smaller: as revealed in the literature, the use of panel data techniques does not actually exaggerate the impact of market access compared with cross-sectional analysis (Head and Mayer, 2011, 2006; Bosker and

15. For instance, the spread of telecommunication technology. In the last decade, the number of mobile phone units has surged rapidly: in 2000, one out of 24 persons owns a mobile phone in ASEAN on average, whereas in 2010 every ASEAN citizen has one mobile phone (ASEAN Community in Figures 2011, p. 44)

Table 3.4 – Baseline results: Market Access and GDP per Capita

	Dep. var. = Ln GDP per Capita (ln gdpc_{it})									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln MA_{it}^{total}	0.83^a					0.55^a				
	(0.00)					(0.00)				
	[0.00]					[0.00]				
ln MA_{it}^{row}		0.75^a					0.73^a			
		(0.00)					(0.00)			
		[0.00]					[0.00]			
ln $MA_{it}^{dom+sea}$			0.78^a					0.55^a		
			(0.00)					(0.00)		
			[0.00]					[0.00]		
ln $MA_{it}^{sea+row}$				0.97^a					0.55^a	
				(0.00)					(0.00)	
				[0.00]					[0.00]	
ln MA_{it}^{sea}					1.06^a					0.19^c
					(0.00)					(0.09)
					[0.00]					[0.08]
Nb. of obs.	200	200	200	200	200	200	200	200	200	200
R^2	0.47	0.20	0.60	0.33	0.49	0.99	0.99	0.99	0.99	0.99
F(.)	668	73	950	134	315	1,182	1,066	1,200	1,195	1,361
Prob > F	0	0	0	0	0	0	0	0	0	0
Country-FEs:	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Time-FEs:	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Robust p-values in parentheses. Bootstrapped p-values in squared parentheses (200 replications).
^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

Garretsen, 2012). More strikingly, the coefficients on ASEAN market access dropped further than that of ROW market access (column (8) and (10) vs. (7)), indicating that the impact of the formers would be overstated if not controlling for the fixed effects. So based on the fixed effects results, an increase by 1% in a country's total market access now increases GDP per capita by about 0.6%; Head and Mayer (2011) also find it equals to 0.6 whereas Bosker and Garretsen (2012) obtain lower coefficient of 0.08.

3.5.2 Accounting for Human Capital and Endogeneity Issue

So far we have only controlled for time-invariant country-specific or country-invariant time-specific variables in our preferred specifications. It is still doubtful that the inclusion of these fixed effects has provided us with accurate estimates of the market access given that there are possibly omitted country-*and*-time-varying variables that are correlated with market access. If this is the case, we would still obtain biased estimates of the coefficient on market access even when country- and year-fixed effects are controlled for. I therefore include additional control variables on human-capital supply that are likely to affect the labor force performance of a country, namely, gross enrollment in tertiary education as a measure for a country's skill, and the share of female labor force to capture the effect of female participation in total employment on wage. [16]

Table 3.5 shows the corresponding estimation results of the wage equation augmented by these two variables and with control for country- and time-fixed effects. We would expected as in the existing works that including the controlled variables and the fixed effects leads to a further drop of coefficients of market access (Hanson, 2005; Breinlich, 2006; Amiti and Cameron, 2007; Head and Mayer, 2011; Bosker and Garretsen, 2012). Moreover, accounting for the fixed effects and the control for the characteristics of labor force have improved the MA coefficients to become more accurate. Columns (1) to (3) show that the coefficients on total MA, ROW MA, and ASEAN MA now become similar, being around 0.6. In columns (4) and (5), when looking at the coefficients on

16. As controls variables, Hanson (2005) uses the share of population by age category, the share of male population, school attainment by age group and variables measuring climate conditions; Head and Mayer (2011) use school attainment; Amiti and Cameron (2007); Hering and Poncet (2010); Fally *et al.* (2010) use similar controls as those of Hanson.

Table 3.5 – Controls for Characteristics of Labor Force

	Dep. var. = Ln GDP per Capita (ln $gdpc_{it}$)				
	(1)	(2)	(3)	(4)	(5)
ln MA_{it}^{total}	0.56^{b}				
	(0.04)				
	[0.04]				
ln MA_{it}^{row}		0.59^{a}			
		(0.02)			
		[0.03]			
ln $MA_{it}^{dom+sea}$			0.56^{a}		
			(0.00)		
			[0.00]		
ln $MA_{it}^{sea+row}$				0.13	
				(0.50)	
				[0.49]	
ln MA_{it}^{sea}					0.10
					(0.51)
					[0.55]
Tertiary Education (%)	0.27^{a}	0.28^{a}	0.26^{a}	0.32^{a}	0.32^{a}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Female Employment (%)	-0.68^{c}	-0.77^{b}	-0.58^{c}	-0.83^{b}	-0.83^{b}
	(0.06)	(0.03)	(0.08)	(0.04)	(0.04)
	[0.07)]	[0.05]	[0.10]	[0.05]	[0.05]
Nb. of obs.	134	134	134	134	134
F(.)	795	695	892	731	724
Prob > F	0	0	0	0	0
R^2	0.99	0.99	0.99	0.99	0.99
Implied σ value:	1.78	1.68	1.78	7.69	9.90

Robust p-values in parentheses. ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

Bootstrapped p-values in squared parentheses (200 replications).

Country- and time-fixed effects in all regressions.

corr(GDPC, Tert. Edu) = 0.63^{c}, corr(GDPC, Fem. Employ) = -0.57^{c}

total market access and ASEAN market access without the domestic component, they have now become statistically not significant although remaining qualitatively unchanged.

Concerning the effect exerted by the control variables, they both are significant in all regressions and are coherent with the results of the existing literature. I find the expected positive effect of tertiary education and the negative impact of female participation in all regressions (Amiti and Cameron, 2007): 10% point increase in the percentage of workers that are tertiary educated raises GDP per capita by about 3% whereas 10% point increase in the percentage of female workers decreases GDP per capita by about 7%, *ceteris paribus* (by 3% for Amiti and Cameron).

Regarding the structural parameter of the model that the coefficient of MA is being $1/\sigma$, all the implied values of σ are greater than one and range between 1.8 and 9.9. The lower σ, the lower in absolute value the price elasticity demand for any individual good and the more imperfect the competition in the market for that good.

Having controlled for fixed time and country effects and included two additional control variables, my results may still suffer from another endogeneity problem due to reverse causality between market access and GDP per capita. Not only does market access influences the level of GDP per capita but GDP per capita in turn also influence of market access (the domestic component), resulting in correlation between the error term and market access which renders the estimates of market access biased. I use the instrumentation technique for market access to remedy this endogeneity problem. Redding and Venables (2004a) take a first step in this direction suggesting that a good instrument should be (i) a variable that is not directly affected by wages or worker location choices and but has an impact on market access; (ii) a variable that does not enter the wage equation directly. However in panel data analysis, the instrument must be time-varying also. I follow Head and Mayer (2011) to use $\sum_j \phi_{ijt}$, being the complete measure of trade costs (time-varying variables in my trade cost specification are infrastructure quality, RTA and AFTA dummies).[17] Given this choice of instrument, Table (3.6) presents these re-

17. Redding and Venables (2004a) have used distances to the world's economic centers (New York, Brussels, and Tokyo) as instruments for each country's market access in their cross-sectional analysis. Head and Mayer (2006) have however questioned about the relevance of these instruments as these cities are themselves high-wage centers and hence, raises another

Table 3.6 – Endogeneity Test

	Instrumental-Variable Estimator: 2SLS					
	(1)	(2)	(3)	(4)	(5)	(6)
ln MA_{it}^{total}	0.30^{c}			0.35^{c}		
	(0.00)			(0.00)		
ln MA_{it}^{row}		0.31^{c}			0.37^{c}	
		(0.00)			(0.00)	
ln MA_{it}^{sea}			0.27^{c}			0.30^{c}
			(0.00)			(0.00)
Tertiary Education (%)	0.43^{c}	0.39^{c}	0.45^{c}	0.26^{b}	0.18	0.32^{c}
	(0.00)	(0.00)	(0.00)	(0.02)	(0.12)	(0.00)
Female Employment (%)	-3.20^{c}	-3.46^{c}	-3.09^{c}	-3.79^{c}	-4.23^{c}	-3.56^{c}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Nb. of obs.	132	132	132	132	132	132
F(.)	91	78	133	13	11	18
Prob > F	0	0	0	0	0	0
R^2	0.49	0.46	0.56	0.52	0.49	0.59
Country-FEs:	No	No	No	Yes	Yes	Yes
Time-FEs:	No	No	No	Yes	Yes	Yes
Weak Identification Test (First-Stage)						
Cragg-Donald's Wald F Statistics:	208	288	106	101	192	479
Endogeneity Test (H0: Regressor is exogenous)						
Durbin-Wu-Hausman's p-value:	0.13	0.01	0.00	0.00	0.00	0.00
Implied σ value:	3.31	3.21	3.77	2.90	2.74	3.31

Robust p-values in parentheses. ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

Pooled models in (1) to (3), country- and time- fixed effects are controlled for in (4) to (6).

Similar results with optimal GMM estimator (not shown here).

sults using 2SLS estimator, without controlling for any country- and time-fixed effects in columns (1) to (3), while in columns (4) to (6) include them.

The first-stage F statistics of week identification test show that the chosen instrument is powerful in determining market access either in the pooled or temporal dimensions. Including the full sets of country- and year-fixed effects, results of the endogeneity tests strongly confirm the presence of endogeneity at 1% level (DWH p-value). Just as in Head and Mayer (2011), all coefficients on market access decreased further after controlling for the fixed effects but they remain significant. In addition their sizes are relatively similar with the coefficients being around 0.3. The implied values of σ have dropped to the range between 2.7 and 3.7, suggesting that trading manufacturing goods are highly differentiated which is a consistent market structure in trade with imperfect competition.

All in all, as predicted by the NEG model, my results reveal that there is a positive effect of market access on variation income level in all measures: cross-country differences in economic geography affect income disparities. Moreover, my results are robust to various tests on controlled variables and potential endogeneity problem. This highlights the importance of interdependence between ASEAN and its regional and international import markets in shaping the pattern of regional economic development.

3.6 Policy Implication: Experiments on Spatial Reach of Shocks on GDP per Capita

I turn to investigate the effect of divergent market access on income disparities by performing some experiments on spatial adjustment of per capita GDP after exogenous economic or policy shocks to market access. Recalling the expression of market access in Eq. (3.6), there are two possibilities through which a shock can increase market access in a country. The first consists in a shock to increase the market size of a trade partner (i.e., the market capacity component, mc_{jt}, which is proxy by $gdp_{jt}^{\hat{\gamma}}$), whereas the second shock arise from

endogeneity issue. As a consequence, they have proposed a country's geographic "centrality", measured as $\ln \sum_j d_{ij}^{-1}$, as instrument because it does not explicitly impose a center and some of empirical analyses in cross-sectional approach have been applying it (Hering and Poncet, 2010).

trade integration policy to increase ϕ_{ijt}. I will therefore experiment the shocks to each of these components separately, namely, GDP shock and policy shock to investment in infrastructure.

The extent of a shock to market access is inferred from the first step of our analysis in which the the new value of market access is calculated using the coefficients obtained from the trade gravity estimation (see column (3) in Table 3.1). Since, in the gravity equation, we have explicitly replaced country-fixed effects dummies by country-specific variables, it is possible to draw insights from policy shocks affecting GDP and infrastructure variables because their variations are no longer included in the fixed effects. In the second step, I measure the impact of the new market access on GDP per capita using the estimated coefficients of the wage equation specified with control variables in Table 3.5. Values for the experiments are presented in Table 3.9 of the Appendices.

In the second experiment, I investigate repercussions of a one-time shock to importer's market size which is simulated by an exogenous GDP shock in one of the partner countries. To this end, I consider 5% GDP shoc in of the inter- and intra-regional markets, namely, Japan and Malaysia. This increase in GDP would raise the demand for goods addressed to all ASEAN exporters who would see their ROW market access increase. Yet, the strength of this demand depends on the degree of spatial linkages: the higher the trade freeness, the larger the impact on the countries' GDP per capita. Results of these two experiments are presented in the first two columns of Table 3.7.

A GDP increase by 5% in Japan raises ASEAN's ROW market access between 0.3% and 0.7% depending on the country, resulting in an improvement of GDP per capita by 0.2% to 0.4% ceteris paribus. On the other hand, the same shock occurred in Malaysia improves market access of ASEAN by 0.1% to 2%, thereby stimulating GDP per capita by 0.1% to 1%. Given that trade costs between Malaysia and its immediate neighbor countries are lower due to positive border effect on trade (cf. contiguity coefficient in column (3) of the gravity regressions in Table 3.1), the spatial reach of the Malaysian shock is more beneficial to Brunei Darussalam, Indonesia, and Thailand, whereas the impact of an extra-regional shock such as the one occurred in Japan seems to be more evenly distributed across the ASEAN countries.

Table 3.7 – Shocks to Market Access and Spatial Adjustment of per Capita GDP

Policy shocks	5% GDP	5% GDP	Infrastructure investment	
Country	in JPN (1)	in MYS (2)	ASEAN-CLMV (3)	(4)
	% Change in Market Access			
	ROW-MA	ASEAN-MA	ROW-MA	ASEAN-MA
Singapore	0.30	0.24	0.00	0.00
Brunei Darussalam	0.73	2.03	0.00	0.01
Malaysia	0.45	0.20	0.00	0.00
Thailand	0.63	0.88	0.00	0.16
Indonesia	0.63	1.82	0.00	0.01
Philippines	0.34	0.27	0.00	0.02
Vietnam	0.35	0.52	0.00	0.13
Lao PDR	0.32	0.14	2.66	2.27
Cambodia	0.57	0.19	2.82	2.87
Myanmar	0.27	0.09	2.82	2.90
	% Change in GDPC per Capita			
Singapore	0.18	0.13	0.00	0.00
Brunei Darussalam	0.43	1.14	0.00	0.01
Malaysia	0.27	0.11	0.00	0.00
Thailand	0.37	0.50	0.00	0.09
Indonesia	0.37	1.02	0.00	0.01
Philippines	0.20	0.15	0.00	0.01
Vietnam	0.20	0.29	0.00	0.07
Lao PDR	0.19	0.08	1.58	1.55
Cambodia	0.34	0.11	1.68	1.62
Myanmar	0.16	0.05	1.68	1.63

The second experiment simulates the impact of a policy instrument aimed at reducing trade costs of the lower-income members, i.e. ASEAN-CLMV, through the development of physical transport and communication infrastructure. This policy is of particular interest because it is not only beneficial to the recipient countries but also to their trading partners. Better infrastructure directly raises market accessibility of the ASEAN-CLMV countries due to lower costs to export. Meanwhile, the other ASEAN countries can expect higher import demand from these locations which will be facilitated by lower import costs. I assume that the investment is made to support these countries in catching up to half the level of the best infrastructure quality in ASEAN, which is that of Singapore. Yet, countries with relatively poor transport networks such as Cambodia and Lao PDR would require higher investment effort to reach this threshold, whereas Vietnam, who is endowed with relatively good transport amenities in the group, would need lower assistance.

Results of this experiment are provided in columns (3) and (4) in Table 3.7. This experiment has raised market access of the Cambodia, Lao PDR, and Myanmar by about 3% (both ROW and ASEAN components), contributing to an increase of their GDPs per capita by about 2% . However, the impact of these shocks to infrastructure seems to be too small in Vietnam as it does not generate any changes in the country's income per capita. Finally, as expected, income level of the ASEAN members seem to benefit from this infrastructure policy although the impact seems to be localized: only countries in close proximity such as Thailand and Vietnam are seeing their intra-regional market access to improve by about 0.1%.

3.7 Conclusion

The work of this chapter applies the structural wage equation in NEG to test for the importance of market access in explaining divergent economic development between the ASEAN countries. Following the empirical methodology introduced by Redding and Venables (2004a), my results provide that the wage equation is relevant in explaining spatial inequalities in per capita income across the ASEAN region over the period 1990-2009.

The necessary step in estimating the wage equation is the construction of market access measure which was built this time from estimates of the trade

gravity equation. In particular, I distinguish between intra- and inter-regional market access in order to differentiate between the impact of trade at different border levels on per capita income. Improved market access conditions substantially increase economic development of the ASEAN countries which is also valid for both intra- and inter-regional market access.

This finding suggests two consequences in terms of spatial relationship and economic development of the ASEAN countries. On the one hand, the countries' economic development depends on economic dynamism of the nearby countries. On the other hand, as proximity matters for development, the ASEAN countries would reap the benefit from promoting linkages with foreign markets through effective integration. Moreover, there is evidence providing the benefit of ASEAN's open regionalism since the inter-regional market access exerts slightly stronger impact on per capita in come than intra-regional market access,

The finding in this chapter yields policy implication in or to provide a harmonious integration of significantly diversified ASEAN economies. Even if intra- and inter-regional trade barriers are lowered, the penalty of distance and other physical geography will continue to be obstacles to economic development of remote countries. Experiment results based on estimates of the structural wage equation show that per capita income of a landlocked country like Laos would increase by three times of the actual level if it had access to maritime transport. Such striking figure strongly recommends the urgency of improving market linkages of the lower-income members where the development of transport infrastructure is among other possible policy measures. This reassures potential gains from various development programs already implemented in ASEAN to improve the quality of regional infrastructure, such as the framework of the Greater Mekong Subregion (GMS) Development Program initiated by Asian Development Bank (in 1992) or the Initiative on ASEAN Integration or IAI (in 2000) just to name a few.

3.A Appendices

3.A.1 List of Manufacturing Exporters and Importers

Table 3.8 – List of Manufacturing Exporters and Importers.

Afghanistan⋆	China (Macao SAR)	India
Albania	Colombia	Indonesia
Algeria	Comoros⋆	Iran
Angola⋆	Costa Rica	Ireland
Argentina	Croatia	Israel
Armenia	Czech Republic	Italy
Australia	Democratic People's Rep. of Korea	Jamaica
Austria	Denmark	Japan
Azerbaijan	Dominican Republic	Jordan
Bahrain	Ecuador	Kazakhstan
Bangladesh	Egypt	Kenya
Barbados	El Salvador	Kyrgyzstan
Belarus	Equatorial Guinea⋆	Lao PDR.⋆
Belgium	Estonia	Latvia
Benin	Ethiopia	Lebanon
Bhutan	Fiji	Liberia⋆
Bolivia	Finland	Libya⋆
Botswana	France	Lithuania
Brazil	French Polynesia	Luxembourg
Brunei Darussalam	Gabon	Macedonia
Bulgaria	Georgia	Madagascar
Burkina Faso	Germany	Malawi
Côte d'Ivoire	Ghana	Malaysia
Cambodia	Greece	Maldives
Cameroon	Guatemala	Mali
Canada	Guinea	Marshall Islands⋆
Chad⋆	Guinea-Bissau⋆	Mauritius
Chile	Honduras	Mexico
China	Hungary	Micronesia⋆
China (Hong Kong SAR)	Iceland	Moldova
Mongolia	Philippines	Switzerland
Morocco	Poland	Syria
Mozambique	Portugal	Tajikistan⋆
Myanmar	Qatar	Tanzania
Namibia	Republic of Korea	Thailand

Continued on next page

Table 3.8 – continued from previous page

Nepal	Russia	Togo
Netherlands	Saint Lucia	Trinidad and Tobago
New Caledonia	Saudi Arabia	Tunisia
New Zealand	Senegal	Turkey
Nicaragua	Seychelles	Uganda
Niger	Sierra Leone⋆	Ukraine
Nigeria	Singapore	United Arab Emirates
Norway	Slovakia	United Kingdom
Oman	Slovenia	United States of America
Pakistan	Solomon Islands	Uruguay
Palau⋆	South Africa	Uzbekistan⋆
Panama	Spain	Venezuela
Papua New Guinea	Sri Lanka	Vietnam
Paraguay	Sudan	Yemen
Peru	Sweden	Zambia

⋆ signifies that the country is included as importers only.

3.A.2 List of RTAs by Year of Entry into Effect (1990-2009)

— AFTA–ASEAN Free Trade Area: Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand (1992); Vietnam (1995); Laos, Myanmar (1997), and Cambodia (1999)
— ASEAN-China (2007)
— ASEAN-Japan (2008)
— Brunei Darussalam-Japan (2008)
— Indonesia-Japan (2008)
— Malaysia-Japan (2006), Pakistan (2008)
— Philippines-Japan (2008)
— Thailand: Laos (1991), New Zealand (2001),Australia (2005), New Zealand (2005), Japan (2007)
— Singapore: Japan (2002), EFTA (2003), Australia (2003), India (2005), Jordan (2005), Korea (2006), Panama (2006), USA (2004)

3.A.3 Data Definitions and Sources

— **GDPC**: is Gross Domestic Product per Capita measured in current US dollars. The data come from UN-ESCAP's Asia-Pacific database with original time coverage between 1970-2010 for all the 10 ASEAN countries.

— **dist**: is great circle distance between major cities weighted by the respective population whereas internal distance is measured as a circular distance within a country: $dist_{ij} = 2/3(\sqrt{area/\pi})$ (Head and Mayer, 2002), from CEPII.

— **CONTIG**: is contiguity dummy variable equal to one if two countries share common land frontier, from CEPII.

— **LANG**: is dummy variable equal to one if at least 20% of the population of both countries speak the same official or national languages or both countries speak common ethnic languages (a second language spoken by at least 20 % of the population), from CEPII.

— **LOCK**: is landlockness dummy variable, from CEPII.

— **ISL**: is dummy variable equals to one for island country, from CEPII.

— **Infrastructure index**: is calculated based on Limao and Venables (2001)'s methodology out of four variables proxying the quality of infrastructure. The required variables come from World Development Indicators 2012 and include network in kilometers of roads, paved roads, rail, the number of telephone lines per capita. The first three variables are expressed relative to the land area in order to obtain the density value. Each variable is normalized around mean equal to one. Finally, the infrastructure index is computed as an arithmetic average over the four normalized variables (or omitting the missing variables), from WDI, ESCAP, and African Development Database.

— **Gross enrollment in tertiary education** is the total enrollment in tertiary education (ISCED 5 and 6), regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving. The data come from World Bank's Education Statistics. Due to data unavailability, statistics of Singapore are completed by labor force with tertiary education instead.

— **Female employment** is the share of female employees in total employment measured in percentage, from UN-ESCAP's Asia-Pacific database.

3.A.4 Values for the Experiments

Table 3.9 – GDP per Capita, Market Access, and Infrastructure Index Applied in the Experiments (value in 2009, countries reported by descending order of GDP per Capita)

Country	GDPC	MA^{total}	MA^{row}	$MA^{dom+sea}$	$MA^{row+sea}$	MA^{sea}	Infrastructure Index (×100)
Singapore	37,069	7,115	436	6,678	895	459	5.38
Brunei Darussalam	27,391	445	225	220	397	173	2.40
Malaysia	6,902	360	114	246	349	235	1.50
Thailand	3,838	225	96	129	160	64	2.51
Indonesia	2,272	327	178	149	278	100	0.47
Philippines	1,836	845	738	107	791	53	0.87
Vietnam	1,118	254	209	45	248	39	2.36
Lao PDR	914	42	27	15	42	15	0.14
Cambodia	744	271	108	163	266	157	0.00
Myanmar	689	303	213	90	298	85	1.27

Source: GDP per Capita from UN-ESCAP's Asia Pacific database. Author's calculation for market access indices.

Chapter 4

Investment Liberalization and FDI Attractiveness: the Role of Bilateral Investment Treaties

Abstract

Gravity for FDI includes common features as in trade gravity that are GDPs and some forms of frictions to investment flows. This chapter applies the gravity framework to investigate determinants of FDI attractiveness in ASEAN with special interest for the role of bilateral investment treaties (BITs). Besides the direct impact, I explore the treaties' indirect impact on FDI attractiveness through reduction of investment barriers. Results provided by the gravity of bilateral FDI stocks from 50 home countries into the ten ASEAN countries between 1990-2007 suggest that implementing a BIT raises inward FDI by about 35% on average. The indirect impact is also witnessed given that BITs exert the expected role in substituting for stable investment environment in the host countries, a mechanism which is principally driven by the treaties implemented with the North home countries. This finding suggests that the purpose of entering into a BITs with ASEAN can be different. The North countries appear to be averse to investment risk abroad and hence rely on BITs as means to legally protecting their foreign investment, whereas the South countries rather perceive BITs as a welcoming signal of the ASEAN countries to their investment.

4.1 Introduction

The reduction of barriers to trade in ASEAN goes hand in hand with investment liberalization so as to promote regional competitiveness and attractiveness to foreign capital. A free and open investment environment is believed to be a prerequisite for attractiveness of foreign direct investment (FDI), which is one of the attributes to ASEAN economic growth (Jalilian and Weiss, 2002; Mirza *et al.*, 2004).

There are a number of investment barriers that mitigates mobility of foreign direct investment (FDI) into developing host countries, many of which are related to risky investment climate and restrictions on capital. In order to attract foreign investors, governments of developing countries are focusing their efforts on eliminating these barriers. Among existing policy measures [1], implementing bilateral investment agreements (BITs) has captured much of their attention. According to the United Nations Conference on Trade and Development (UNCTAD), the number of signed treaties increased dramatically during the 1990s. This phenomenon was largely due to the surge of developing nations as active players in signing BITs. In particular, the total number of BITs concluded worldwide grew from 385 in 1989 to 2,807 treaties by the end of 2010 and many of the recent treaties are implemented by transition economies and developing Asian countries (UNCTAD's Database on BITs and UNCTAD (2011)).

BITs are recognized as agreements between two countries to provide enforceable rules and legal rights to investors in each other's territories. Their main purpose is to mitigate investment barriers faced by multinationals when investing abroad and thus attracting higher flows of FDI into the signatory host countries. Since foreign investors are averse to discrimination and expropriation risks of their capital, BITs provide a guarantee that the host governments are committing themselves to fair treatment and respect for investors' property rights. BITs are therefore regarded as substitutes for good domestic institutions in the host countries and hence heighten the direct impact on FDI attractiveness. The host governments view this institutional substitutability effect as an indirect impact of BITs because they not only lead to greater amount of

1. As for example, regulations related to foreign capital (Asiedu, 2004; Desai *et al.*, 2006), the signing of tax treaties (Blonigen and Davies, 2004), or membership in international trade agreements (Büthe and Milner, 2008).

domestic investment but also establish a stable environment that can promote inflows of FDI.

Despite the popularity of BIT, there is still no general consensus of empirical findings on their effectiveness in developing host countries. While some authors suggest that BITs promote FDI (Egger and Pfaffermayr, 2004; Neumayer and Spess, 2005; Kim, 2007; Busse *et al.*, 2010; Haftel, 2010), the other find the impact to be either insignificant or conditional on institutional or economic environments of the hosts (Hallward-Driemeier, 2003; Tobin and Rose-Ackerman, 2005, 2011). Even so, a few of them are successful in providing evidence of the expected role of BITs in acting as substitutes for a sound investment climate to attract FDI (Neumayer and Spess, 2005; Kim, 2007; Desbordes and Vicard, 2009; Busse *et al.*, 2010). Moreover, these works only focus on the impact of BITs originated from developed countries as they employ FDI data from the U.S. or the OECD members.[2] Not accounting for developing host countries in the dataset may run the risk of sample selection and omitting the increasing role of developing countries as investors and active players in signing BITs.

The analysis in this chapter is motivated by these mixed empirical findings and more importantly by an upsurge in the number of BITs implemented by the ASEAN countries in the past two decades. Applying ASEAN's bilateral inward FDI data, the focal questions of our analysis are twofold. First, are BITs relevant in promoting inward FDI to the host country and do they tend to favor FDI originating from a particular group of home countries? Second, if the answer to the former question is positive, how do the treaties interact with existing investment barriers in the host country to create a favorable environment and hence, attract further FDI?

These questions are investigated with help of a structural gravity equation for FDI (Kleinert and Toubal, 2010), including characteristics such as market sizes of the home and host countries (e.g., GDPs) and distance trade costs, and features that allow us to differentiate the motives of investment that are market seeking (i.e., horizontal FDI) and cost-efficiency seeking (e.g., vertical FDI). The answers to these questions contribute to BIT-FDI literature in various ways. First, I use ASEAN's FDI dataset to establish findings on the direct and indirect impact of BITs, in particular, the role of BITs in reducing

2. Table 4.1 provides a summary of the existing works. Busse *et al.* (2010) is so far the only study that has included developing home countries in their dataset.

certain investment barriers to attract FDI into developing host countries. The dataset is built on statistics of bilateral FDI stocks between 50 developed and developing home countries and the ten ASEAN host countries, assembled from various institutions for the period 1990-2007. Second, this dataset allows me to distinguish between FDI from the North and the South economies. I am therefore able to investigate the rationale behind different impacts of BITs on FDI coming from groups of developed and developing countries.

In the remaining parts of the chapter, Section 4.2 discusses in more detail some conceptual features of BITs in reducing barriers to FDI along with a survey on existing empirical works. Section 4.3 describes some stylized facts on ASEAN's FDI and the development of BITs in the region in order to gain an insight on our research questions. Section 4.4 presents research design, dataset description, and empirical issues. Section 4.5 discusses results on BIT effectiveness, followed by conclusion in Section 4.6.

4.2 Understanding the Relationship between BITs and FDI

4.2.1 Features and Mechanism of BITs in Reducing Investment Barriers

Typical BITs are designed to reduce barriers to FDI through two types of basic provisions contained therein (UNCTAD, 1998, 2007). The first is *investment promotion* aimed at encouraging investment in signatory countries. These types of provisions include guarantee for standards of fair and equitable treatment in accordance with international law, in particular, provisions on national treatment (i.e., foreign investors must be treated at least equally to national investors) and most-favored-nation treatment (i.e., privileges granted to one foreign investor must be granted to all investors). The second is *protection* against investment barriers of political risks associated with political disturbance, poor property rights, or unreliable rules, which are caused by the lack of strong institutions in the host states. This type of provisions provides foreign investors with a guarantee of compensation for losses in the event of damage to investment, free transfer and repatriation of capital and profits,

and most importantly, the ability to resolve disputes before an international arbitration body (the International Center for the Settlement of Investment Dispute–ICSIC).

There are two underlying mechanisms by which BITs are believed to reduce barriers to inward FDI. On the one hand, they function as a *signaling device* to foreign investors of a pro-investment climate (Ginsburg, 2005; Neumayer and Spess, 2005; Haftel, 2010). On the other hand, they reflect host governments' *credible commitment* to comply with initial terms of investment conditions. As foreign investors are sensitive to political risks when investing abroad, the theoretical role of BITs is to act as substitutes for strong institutions in attracting FDI. In other words, their effectiveness is conditional on the quality of domestic institutions, i.e., the treaties are expected to increase FDI more in countries with weak political institutions than with good institutions.

As a result, developing host countries are motivated to enter into BITs in order to gain confidence from foreign investors. Countries with weak domestic property rights and rule of law can indirectly benefit from BITs to bypass the need to strengthen the quality of their institutions. Moreover, given a heightened competition for foreign capital worldwide, developing countries are also rushing to sign the treaties, allowing them to capture the larger share of FDI from developed countries (Elkins *et al.*, 2006). [3]

4.2.2 Previous Empirical Contributions

Quantitative studies on the impact of BITs on FDI have started only recently and their conclusions have remained quite different. The studies however progress in two waves.

The first investigates the direct impact of BITs on inward FDI to a group of low- and middle-income economies as well as their indirect impact through the channel of institutional quality of the host country. In particular, they investigate how the treaties interact with the level of domestic institutions to attract FDI, i.e., whether they exert their expected role in acting as substitutes for good domestic institutions.

3. China serves as one of the examples. The country has become the first developing country to be involved in the largest number of BITs over the past two decades, a result which partially contributes to the country's success in attracting a growing share of global FDI inflows in developing countries (UNCTAD, 2006, p. 28).

The pioneer works like Hallward-Driemeier (2003) and Tobin and Rose-Ackerman (2005) find little evidence that BITs induce higher FDI attractiveness and suggest that the treaties do not exert their expected role of being substitutes for good domestic institutions but rather complementary. This would imply for developing countries that, in order to increase inflows of FDI, they must have the necessary domestic institutions being able to interact with BITs to ensure credible commitment to foreign investors. [4] On the other hand, Neumayer and Spess (2005) find a strong connection between BITs and FDI attractiveness and that the treaties function as substitutes for good institutional quality as expected. This result recommends that succumbing to the obligations of BITs is worthwhile for developing host countries in order to attract FDI and the impact is even stronger in politically weak states. However, the effectiveness of BITs may vary depending on the origins of foreign investment. In particular, Kim (2007) finds that BITs ratified with high-income home countries are effective unconditionally on the host country's political condition, whereas BITs in force with low-income countries act as substitutes for political credibility in a high-risk host country.

The second wave of studies further investigates the indirect impact of BITs in attracting FDI through other channels than institutions, such as bilateral political relations (Desbordes and Vicard, 2009), host countries' measures of investment liberalization (Busse *et al.*, 2010), and the condition of economic fundamentals in the host countries (Tobin and Rose-Ackerman, 2011). In particular, Desbordes and Vicard (2009) construct an index measuring the quality of interstate relationship to capture political features such as governmental cooperation and interstate wars and conflicts where they find the expected role of BITs in acting as substitutes for friendly countries in attracting FDI. [5] In other words, a BIT tends to increase bilateral FDI more between countries with tense relationships than between countries with good diplomatic relationship.

Using the Chinn-Ito index of capital account openness, Busse *et al.* (2010) account for the role of unilateral investment liberalization which has become

4. Institutional quality is measured in various ways here. For example, Hallward-Driemeier (2003) uses a set of variables such as rule of law, regulatory quality, and corruption controls, while Tobin and Rose-Ackerman (2005) use the degree of political risk which is a composite index of expropriation risk, established mechanisms for dispute resolution, contract enforcement, government credibility, corruption, and quality of bureaucracy.

5. The observations on political features are collected from qualitative data on armed conflicts and quantitative data on daily diplomatic events.

a popular measure of developing countries in attracting FDI since the 1990s (Busse *et al.*, 2010, p. 154).[6] They also include real GDP growth of the host countries to capture the effect of market seeking FDI and the difference in *per capita* GDP between home-host countries to detect for presence of vertical FDI. Their results clearly suggest the benefits for developing countries in implementing a BIT, and that the treaties are substitutes for good domestic institutions and financial openness as expected.

Finally, the study of Tobin and Rose-Ackerman (2011) highlights the roles of economic fundamentals and global competition for FDI among BIT signatories. Strong economic fundamentals as captured by high GDP, GDP growth, and trade openness tend to enhance the positive impact of BITs in attracting FDI. Interestingly, the effectiveness of BITs tends to reduce with the increasing number of implemented BITs worldwide, a result supporting the claim of the negative influence of heightened competition for FDI from other BIT signatories.

Table 4.1 summarizes divergent findings on direct and indirect impacts of BITs on FDI. It is to be noted that these ambiguous results can be explained by different research designs in terms of FDI data employed, the country samples, and the measures of BIT variable. Before turning to this part, the next section describes some stylized facts on development of BITs and FDI in the ASEAN region in order to gain some insights into my research questions.

6. The Chinn-Ito index is a composite index constructed out of measures such as regulatory controls over current or capital account transactions, the presence of multiple exchange rates, and the requirements of surrendering export proceeds (Chinn and Ito, 2008).

Table 4.1 – Summary of the Mixed Findings on the BIT-FDI Relationship

Author(s) & Dataset	Direct Effect	Conditional Effect on Institutions	Other FDI Determinants
Hallward-Driemeier (2003): Bilateral inflows from 20 OECD to 31 developing countries (1980-2000)	No	Complementarity	Home GDP (+), host GDP (+) , host GDP per capita (+), inflation (-), trade openness (-), skill differential, NAFTA (+), transition economies
Tobin and Rose-Ackerman (2005): Total net inflows into 63 developing countries (1985-2000) and U.S. outflows in 54 developing countries (1980-2000)	No	Complementarity	GDP, population (+), economic growth (+), resources, inflation (-)
Neumayer and Spess (2005): Total OECD outflows to 119 developing countries (1970-2001)	Yes	Substitutability	GDP per capita (+), population (+), econ. growth (+), inflation (-), resources (+), FTA, WTO
Kim (2007): Total inflows to 10 Asian countries (1984-2002)	Yes	Substitutability	GDP per capital (+), trade openness (+), real wage (-), infrastructure (+), APEC (+)
Desbordes and Vicard (2009): Bilateral stocks from 30 OECD countries to 62 OECD and non-OECD countries (1991-2000)	Yes	Complementarity	Home GDP, host GDP, bilateral distance (-), contiguity, common language (+), home GDP per capita, host GDP per capita (+), diplomatic relationship between states, EU, NAFTA, GATT
Busse *et al.* (2010): Bilateral flows from 27 developed/developing countries to 83 developing countries (1978-2004)	Yes	Substitutability	Host GDP (+), GDP gap between home and host (+), econ. growth (+), inflation, trade openness, RTA, common currency, capital openness (+)
Tobin and Rose-Ackerman (2011): Total inflows to 97 developing countries (1984-2007)	No	Complementarity	The number of BITs in the world (+), host GDP per capita (+), GDP growth (+), trade openness (+), resource, population (+)

Source: Author's compilation. Sign of significant coefficients in parenthesis.

4.3 The Pattern of FDI and BITs in ASEAN

The development of FDI inflows in ASEAN goes hand in hand with the expansion of the number of BITs concluded by member countries. This may reflect the countries' strong commitment to eliminate cross-border investment barriers in an effort to bring in further foreign capital.

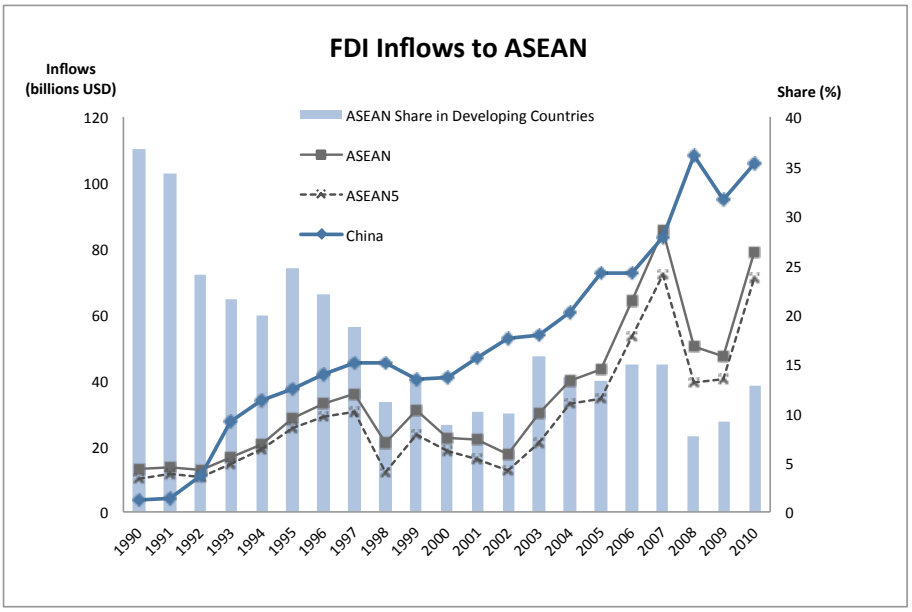
Figure 4.1 shows that the region continued to receive increasing FDI inflows between 1990-2010 despite some fluctuations during the Asian financial crisis of 1997-1998 and the global financial crisis of 2007-2009. This is equivalent to an average increase of inflows by about 10 percent per year. Despite this outstanding FDI record, the ASEAN's share of global FDI inflows into developing countries is contracted by more than half from 37 percent to 13 percent during this period, a decline which was largely explained by the surge of FDI inflows into China who has outperformed ASEAN's inward FDI since 1992.

While ASEAN is challenged by the rising competition for FDI from other developing economies, Figure 4.2 shows that the cumulated number of signed BITs by the ASEAN countries proliferated in the 1990s in an effort to enhance and secure their FDI attractiveness. Within five decades, the number of signed BITs soared by ten times from 34 treaties between 1960s-1980s to 351 treaties by 2011. Moreover, there is also evidence suggesting a positive relationship between the distribution of FDI in ASEAN and the number of BITs. Statistics on BITs show that ASEAN major receivers of FDI, namely Singapore, Malaysia, Thailand, Indonesia, and the Philippines (ASEC, 2011, p. 6), are also principal tenants of BITs in the region (cf. the last column of Table 4.4 in Appendices).

Figure 4.3 shows that principal sources of inward FDI stock in ASEAN are the triad of developed economies, namely, the EU countries (24 percent), Japan (14 percent), and the United States (8 percent). Remaining FDIs originate from the ASEAN countries (14 percent), the Asian Newly Industrializing Economies–NIEs (6 percent) and European transition economies (6 percent). Japanese investment continued to be stable over the period whereas the shares of the EU countries and the U.S. were relatively fluctuating and were negatively affected by the global financial crisis in 2007. On the other hand, emerging economies, notably the Asian NIEs, China and India gradually gained in their investment shares during this period.

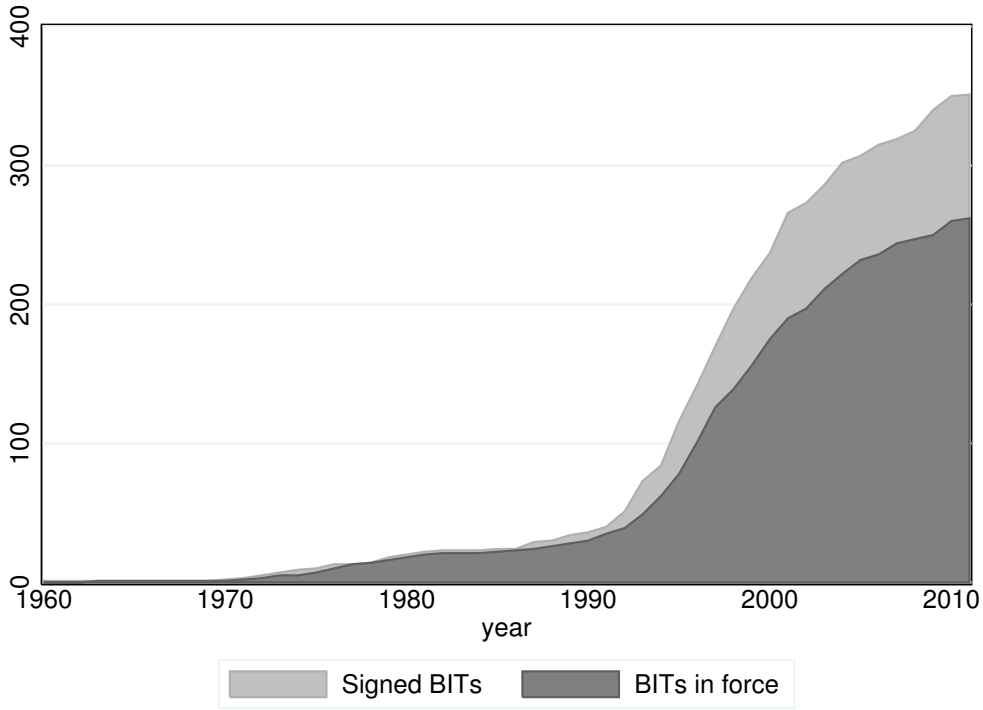
Despite the role of developed economies as major providers of FDIs in

Figure 4.1 – FDI Inflows to ASEAN and the Region's Share in Total Developing Countries, 1990-2010



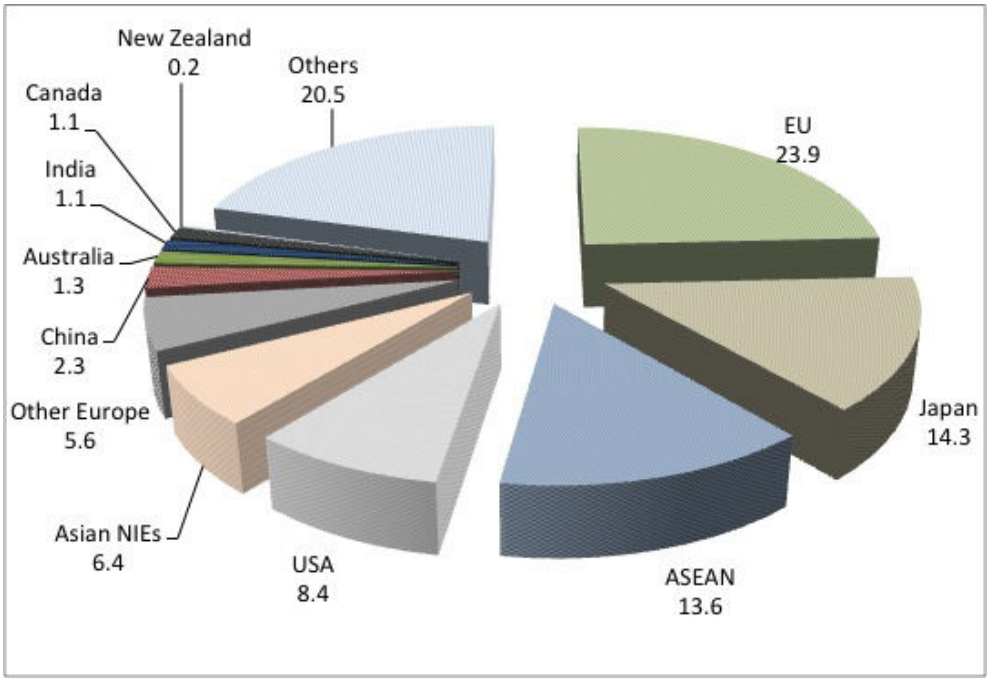
Source: ASEAN FDI data from UN-ESCAP (2010), Chinese FDI figures extracted from UNCTAD FDI database. The ASEAN-5 countries include Indonesia, Malaysia, Philippines, Singapore, and Thailand.

Figure 4.2 – Cumulated Number of BITs in ASEAN, 1960-2011



Source: Author's calculation from UNCTAD's BITs database.

Figure 4.3 – Distribution of Inward Stock of FDI in ASEAN by Source Country, 2002-2009 (%)



Source: ASEAN Statistical Yearbook 2010.

ASEAN, they are involved in a smaller number of BITs compared with developing home countries. In fact, they accounted for 30 percent of all BITs in force by the end of 2011, against 20 percent for the European transition economies, and 12 percent for intra-regional treaties. Among the top investors, only the EU and EFTA countries are the most active in concluding BITs with the ASEAN countries. Germany is the first signatory in ASEAN in 1960 with Malaysia and has entered into BITs with all the ASEAN members except Myanmar. While the United States has never negotiated any BITs, Japan has implemented the agreements with only Vietnam (in 2004), Cambodia (in 2008) and the Lao PDR (in 2009). Turning to ASEAN's investor partners from developing countries, the emerging economies, namely, China, India, and Korea appear to be the most active signatories. China has signed BITs with all the ASEAN members. India has also done so but except for Cambodia, whereas Korea has signed the treaties with every member but Singapore and Myanmar.

Finally, nearly all of the ASEAN BITs signed with developed economies have entered into effect (about 95 percent) but about one third of BITs signed with developing countries has not been implemented yet. This stylized fact

points out the possibility that there may be a different impact exerted by BITs concluded with home countries from the North and the South economies, and that the intentions in implementing a BIT may also differ among them.

4.4 Research Design and Empirical Methodology

Quantitative studies on the impact of BITs are conducted either in monodic approach using data on net FDI inflows (Tobin and Rose-Ackerman, 2005, 2011; Neumayer and Spess, 2005) or in dyadic approach using data on bilateral FDI (Hallward-Driemeier, 2003; Tobin and Rose-Ackerman, 2005; Busse *et al.*, 2010). Both approaches have their pros and cons, and yield different interpretation on the effect of BITs. Studies using monodic FDI data are able to work with a large set of developing host countries. However, *BIT* variable is measured as the total number of treaties held by the host, implying that it captures the impact on all foreign investment including the one not covered by BITs. On the other hand, the analysis in dyadic approach measures *BIT* variable as a dummy equal to one if the home and host countries are involved in the same BIT. Although the studies in this approach may be limited by smaller sample size due to incomplete observations on bilateral FDI data, the analysis in this chapter follows this approach as they allow us to properly estimate the actual effect of entering into a BIT.

4.4.1 Hypotheses to be Tested

With insights drawn from the ASEAN experience, this chapter attempts to clarify the findings about the relationship between BITs and FDI attractiveness by investigating the following hypothesis.

Hypothesis 1: Direct Effect

If developing host countries implement BITs in an effort to attract greater amount of FDIs, I expect that bilateral FDI to the ASEAN countries should be positively related to a BIT variable. Yet, we expect that the effectiveness of North-South and South-South BITs may differ among them.

Hypothesis 2: Indirect Effect

The effectiveness of BITs may be conditional on the level of investment climate in the host country. Empirically, this hypothesis can be tested in a conditional model, i.e., by looking at how *BIT* variable interact with the investment condition in question to attract FDI. I will examine the role of domestic institutions and investment liberalization, respectively. The negative coefficient on the interaction term indicates that the constitutive variables are substituting each other in attracting FDI, whereas the positive coefficient implies their complementarity (Braumoeller, 2004; Brambor *et al.*, 2006).

Hypothesis 3: The objective of entering into a BIT

It would be of interest to investigate why developed home countries, who in fact account for the majority of inward FDIs in ASEAN, are not engaged in BITs as much as developing home countries. Moreover, there should be a reason explaining a relatively higher implementing rate of BITs concluded with developed home countries than those concluded with developing home countries.

Given the possibility that BITs can either serve as substitutes for, or a complement to, a stable investment environment, I expect that countries may differ in their intentions to conclude a BIT. If BITs exert the substitutability effect as theoretically expected, the host country is motivated to implement a BIT so as to enforce a reliable environment to attract FDI, whereas the home country relies on the treaties to assure investment protection. If BITs show instead the complementarity effect, the host country is unlikely to rely on BITs as a signal of investment protection but rather of FDI-friendly environment.

4.4.2 The Gravity Model for FDI

The stated hypotheses are tested by estimating a gravity-type model which has earned a growing popularity among empirical works on FDI (Brainard, 1997; Carr *et al.*, 2001; Egger and Pfaffermayr, 2004; Braconier *et al.*, 2005; Bergstrand and Egger, 2007).

Specifically, I apply the structural gravity for FDI developed by Kleinert and Toubal (2010) from two classes of trade models with multinational firms that are the proximity-concentration model (Brainard, 1997; Helpman *et al.*,

2004) and the factor-proportion model (Venables, 1999a). FDI between two locations is determined by market sizes of home and host countries, the trade costs which incurred in the distance separating them. In addition, the model includes the ratio of relative factor endowment (RFE) and the joint market size of the home and host countries to differentiate between horizontal and vertical natures of FDI. [7]

Specifically, the positive coefficient on the *RFE* variable indicates that investment between two countries is driven by production fragmentation of the home country as a result of low-skilled labor scarcity related to the host country, and hence giving rise to vertical FDI. I also account for additional control variables that are common in the gravity literature, namely, geographical features, historical ties between the home and the host countries, and the quality of infrastructure.

To capture the impact of BITs, I include a dummy variable equals to one at the implementing year of a BIT. While there are studies that rather measure BIT at the signing year (Tobin and Rose-Ackerman, 2005; Neumayer and Spess, 2005), Egger and Pfaffermayr (2004) demonstrate that the effectiveness of BITs depends much on whether the treaties are simply signed or truly in force. It appears that signed but non-in-force BITs tend to exert no impact on FDI as they only provide anticipation effect to foreign investors of a sound investment climate without any guarantee that the host states are submitted to the agreed commitment.

I also include other control variables in the gravity model that affect barriers to investment in the host country such as infrastructure quality, the quality of domestic institutions, and the level of financial openness. It is arguable that improved quality of institution may encourage FDI (Neumayer and Spess, 2005; Tobin and Rose-Ackerman, 2005; Desbordes and Vicard, 2009; Busse *et al.*,

7. A number of empirical works on FDI have adopted the gravity equation based on the knowledge-capital (KK) model of multinationals (Markusen, 1995; Markusen *et al.*, 1996), which also has the particularity of combining determinants of both horizontal and vertical FDI into one equation. Its specification differs from that of Kleinert and Toubal (2010) in two aspects. First, it is the way in which the relative factor endowment (RFE) between home and host states is defined. In the KK model, the RFE is the difference in skilled labor whereas in Kleinert and Toubal's model, the RFE term accounts for the differences in both skilled and unskilled labor. Second, the gravity of KK model include the interaction terms between size and endowment differences of the home and host countries. The interaction terms can lead to multicollinearity problem when applying panel data analysis which can be a major shortcoming of the KK model (Busse *et al.*, 2010, p. 155).

2010) by preventing the costs related to political risk such as corruption (Wei, 2000), whereas less restrictive controls on capital account are associated with higher FDI inflows (Gastanaga *et al.*, 1998; Asiedu, 2004; Desai *et al.*, 2006).

Specifically, the gravity equation for ASEAN bilateral FDI is as follows:

$$\begin{aligned}\ln FDI_{ijt} = {} & \beta_o + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DIST_{ij} + \beta_4 G_{ij} + \beta_5 RFE_{ijt} \\ & + \beta_6 \ln(gdp_{it} + GDP_{jt}) + \beta_7 \ln INFRA_{jt} + \beta_8 \ln INSTIT_{jt} \\ & + \beta_9 \ln KAOPEN_{jt} + \beta_{10} BIT_{ijt} + Home_i + Host_j + T_t + \epsilon_{ijt}\,, \end{aligned} \tag{4.1}$$

where FDI_{ijt} stands for bilateral stock of FDI in ASEAN host country j from home country i in year t, $DIST_{ij}$ is the bilateral distance, G_{ij} is a vector of geography-specific dummies (e.g., contiguity $CONTIG_{ij}$, common language $LANG_{ij}$, and colonial tie COL_{ij}), $RFE_{ijt} = \ln\left(\frac{S_{it}}{S_{it}+S_{jt}} / \frac{L_{it}}{L_{it}+L_{jt}}\right)$ is the relative factor endowment ratio defined as relative shares of home's high-skilled labor force (S_{it}) in total high-skilled labor ($S_{it} + S_{jt}$) and home's low-skilled (L_{it}) in total low-skilled labor force ($L_{it} + L_{jt}$), $GDP_{it} + GDP_{jt}$ is the joint market sizes of home and host countries, $INFRA_{jt}$ is the index of infrastructure, $INSTIT_{jt}$ is a measure of quality of domestic institutions, $KAOPEN_{jt}$ is a measure of capital account openness, BIT_{ijt} is a dummy variable for a bilateral investment treaty between country i and j, $Home_i$ (and $Host_j$) corresponds to a home (and host) country time-invariant fixed effects, T_t is a country-invariant time fixed effect, and ϵ_{ijt} is the error term.

To investigate the indirect effect of BITs through the channel of domestic institutions and financial openness, I introduce, one at a time, an interaction term between BIT_{ijt} with $\ln INSTIT_{jt}$ and with $\ln KAOPEN$ in the baseline specification. A negative (or positive) coefficient of the term suggests substitutability (or complementarity) effect between the two variables.

4.4.3 Data Description and Estimation Issues

Bilateral inward FDI to ASEAN countries

The dependent variable is bilateral FDI into the ten ASEAN countries measured in stock in order to avoid year-on-year volatility of the flows. Series of FDI data are assembled from three sources, namely, the ASEAN Secretariat,

the Asian Development Bank, and the OECD. [8] First, the majority of bilateral FDI data are drawn from ASEAN FDI Database as published in *Statistics of Foreign Direct Investment in ASEAN: tenth edition, 2008*, which was made available upon request by the ASEAN Secretariat. This database contains ASEAN's bilateral FDI data up to 2007 covering more than 40 source countries in Europe, Asia, North and South America, the ASEAN countries, and the rest of the world. Second, missing values for the Asian home countries, such as East, Southeast and South Asian economies are completed by statistics from the Asian Development Bank (Asia Regional Integration Center–ARIC). Third, FDI statistics of the home countries that are not available in the first two databases or that contain missing observations are completed by statistics on outward FDI from the OECD *International Direct Investment Database*. Additional countries taken from this database are mostly the Eastern European countries and Latin American countries. Finally, I come up with a dataset covering a period between 1990-2007, comprising 23 developed and 27 developing home countries and all the ten ASEAN host countries. The sample remains, however, unbalanced with 485 country pairs, 5,741 FDI observations, out of which 1,852 observations are zero values or 32 percent of total observations. List of countries is provided in section 4.A of the Appendices.

Determinants of FDI

Information on implemented BITs is gathered from UNCTAD's BITs database which contains information on all the BITs available for 178 economies from the year 1959 to date.

As proxy for market sizes, real GDP figures are measured as constant U.S. dollars in year 2000. As for the endowments of skilled and unskilled labor forces for which we lack direct observations, I take labor force in the industrial sector as a rough measure for the skilled labor force and the labor force in the agricultural sector as a measure for the unskilled labor force. Both quantities are obtained from multiplying the share of employment in each sector by a country's total labor force. [9] The GDPs and labor data come from World Bank's

8. Although we may question about the compatibility between evaluation method of FDI among these sources, I obtain a relatively complete dataset on bilateral inward FDI in ASEAN, covering the largest set of home countries and years.

9. A number of empirical works resort to either educational data or labor force survey data to measure skilled labor endowment, such as gross population enrolled in tertiary edu-

WDI. Data on geographical features, bilateral distance, contiguity, common language, and colonial relationship, come from CEPII.

Infrastructure quality is an index constructed according to Limao and Venables (2001)'s methodology out of four infrastructure variables, namely, freight transports by air, road, rail (million ton/ km.), and the number of telephone lines per inhabitant. Each variable being normalized around mean equals to one before taking arithmetic average over the four normalized values. Data on infrastructure come from World Bank's WDI.

In line with Neumayer and Spess (2005); Busse *et al.* (2010), the adopted measurement for institutional quality of the host country is the political constraint index on government's executive branch $PolCon$ that was developed by Henisz (2000). [10] Unlike other institutional indicators employed in the literature, $PolCon$ provides rather complete series of observations for the ASEAN countries. [11] The indicator ranges from zero to one, where zero indicates complete executive discretion in reversing policies and one corresponds to absence of political discretion and hence non-feasibility of policy change. The degree of capital account openness in the host country is measured by Chinn-Ito Financial Openness Index $CapOpen$ (Chinn and Ito, 2008) [12]. The higher the index value, the fewer controls there are on the capital account. Finally, in order to

cation (Egger and Pfaffermayr, 2004; Baltagi *et al.*, 2007), or total labor force with tertiary education. These measures have however some shortcomings when applied to my dataset. First, there are significant missing observations with regard to education or workers' ability of the ASEAN countries. Second, using the level of tertiary education can over-quantify the effective number of skilled labor force as school life expectancy may vary across countries or years. Furthermore, school enrollment rate is likely to grow over time as a result of the development process experienced in many countries, and hence, can in turn exaggerate the true number of skilled labor in these countries.

10. Downloaded from: http://www-management.wharton.upenn.edu/henisz/ (accessed April, 2012)

11. The measures of institutional quality in the studies by Hallward-Driemeier (2003) and Tobin and Rose-Ackerman (2005) come from the International Country Risk Guide (ICRG), with the former using various components of institutional quality while the latter applies a composite index of components such as expropriation risk, access to dispute resolution, contract enforcement, government credibility, corruption, and quality of bureaucracy. The ICRG is an extensive data source on institutions but is limited by commercial access. Alternatively, there are measures such as World Governance Indicators from Kaufmann et al., 2009, Corruption Perception Index *CPI* from Transparency International, or index of democracy level *POLITY2* from Integrated Network for Societal Conflict Research (INSCR) which are available free of charge but these sources contain a significant number of missing observations for the ASEAN countries.

12. Downloaded from: http://web.pdx.edu/∼ito/Chinn-Ito_website.htm (accessed April, 2012)

avoid the loss of negative or zero values when taking the natural logarithm of *PolCon* and *CapOpen* indices, I follow Busse *et al.* (2010) in applying to these values the logarithmic transformation: $x' = ln\left(x + \sqrt{(x^2+1)}\right)$.

Estimation methods

The consistent estimator should be able to sidestep the problem of many zero-FDI values in my dataset. A number of empirical works applying FDI gravity models, such as (Desbordes and Vicard, 2009; Busse *et al.*, 2010; Kleinert and Toubal, 2010) has resorted to the non-linear count-data estimator of the Poisson Pseudo-Maximum Likelihood (PPML), a method first suggested by Silva and Tenreyro (2006) for trade gravity models. The PPML estimator has the advantage for being robust to different patterns of heteroskedasticity while also providing a natural way to overcome the zero observations. In STATA, this estimator can be implemented with either the official *poisson* command with option for robust standard error or the user-written package *ppml* that computes robust standard error by default. The dependent variable FDI_{ijt} is estimated in level with different controls for the fixed effects. I also provide results by the standard OLS regressions for comparison with the PPML estimator.

4.5 Empirical Findings

4.5.1 Direct Impact: Do BITs Really Matter for ASEAN's Inward FDI?

Table 4.2 shows results of the baseline regression by OLS and PPML estimators along with various controls for robustness tests. Results from columns (1) and (2) provide evidence supporting a positive BIT-FDI relationship irrespective of the estimation methods: a BIT in force significantly induces foreign investment into the ASEAN signatory host countries by about 35% [13] compared with the absence of a treaty. This finding is consistent with existing work using the samples composing of developed/developing host countries (Busse *et al.*, 2010; Haftel, 2010). In column (3), I introduce the dummy $BIT_{ij,t}^{signed}$ captur-

13. The effect is calculated as $(e^{0.3} - 1) \times 100$.

ing the effect of signed but non-implemented treaties, which account for about one-fourth of total BITs in ASEAN. Its coefficient is insignificant compared to $BIT_{ij,t}$, confirming the finding of the literature that BITs are only effective if they are truly implemented (Egger and Pfaffermayr, 2004).

As for the remaining FDI determinants, from the perspective of the host country, the larger market sizes, the shared language and historical ties, good infrastructure quality, and higher financial openness exert a positive impact on bilateral investment, whereas the negative impact is found for bilateral distance. The negative coefficient on contiguity is interpreted the fact that FDI tends to decrease if the home country were an immediate neighbor of the host country or FDI would increase if otherwise. This result complies with the stylized fact that major FDI providers in ASEAN are located outside of the region.

The negative coefficient on political constraint indicates that weak institutions as expressed by high discretion of the host government to reverse policies do not actually discourage FDI as we would have expected. It is possible that foreign investors in ASEAN are not much concerned with the ability of policy change but rather with the executed policy itself. Haftel (2010) also draws the same finding from the study on U.S. FDI outflows to developing countries, in which the negative institution coefficient is interpreted as the preference of multinationals to higher constraints but on favorable policies rather than lower constraints but on unfavorable policies for FDI. [14]

Regarding the coefficients on relative factor endowment and the sum of GDPs that allow us to determine the nature of investment, the structural gravity equation would predict emergence of vertical FDI when the RFE coefficient is positive and the coefficient on the joint GDPs is equal to one. However, our gravity model cannot fully support this prediction as both coefficients do not show expected signs. Nevertheless, this finding should be interpreted with caution as the RFE coefficient may be biased due to the construction of this variable given the data availability. [15]

Turning to results of the robustness tests in columns (4) and (7) of Table

14. This result is however debatable given the choice of $PolCon$ as indicator of the quality of domestic institutions. Unexpected result can be explained by the fact that $PolCon$ reflects the degree of political credibility rather than investment environment related to rule of law, expropriation risk, or contract enforcement.

15. Kleinert and Toubal (2010) however find much stronger evidence for horizontal FDI in their gravity model where they are also unable to strictly differentiate between the horizontal and vertical FDI.

Table 4.2 – The Impact of BITs on Stocks of Inward FDI in ASEAN (1990-2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline Results			Robustness Analysis			
Estimator	OLS	PPML	PPML	PPML	PPML	2SLS	2SLS
Dependent variable	$\ln FDI_{ijt}$	FDI_{ijt}	FDI_{ijt}	$\ln(\frac{FDI_{ijt}}{FDI_{it}})$	FDI_{ijt}	$\ln FDI_{ijt}$	$\ln FDI_{ijt}$
$\ln GDP_{it}$	2.24^a	1.44^a	1.47^a	1.71^b	-1.74	-1.99	-1.64
	(0.51)	(0.42)	(0.42)	(0.78)	(1.50)	(1.26)	(1.20)
$\ln GDP_{jt}$	1.88^a	1.68^a	1.68^a	2.25^a	0.88	0.67	0.44
	(0.49)	(0.43)	(0.43)	(0.84)	(0.60)	(0.65)	(0.68)
$\ln DIST_{ij}$	-1.10^a	-0.96^a	-0.97^a	-0.57^a			
	(0.11)	(0.10)	(0.10)	(0.12)			
$CONTIG_{ij}$	-0.16	-1.15^a	-1.17^a	0.25			
	(0.18)	(0.22)	(0.22)	(0.19)			
$LANG_{ij}$	-0.11	0.41^a	0.41^a	-0.26^b			
	(0.12)	(0.11)	(0.11)	(0.13)			
COL_{ij}	1.72^a	0.75^a	0.76^a	1.99^a			
	(0.12)	(0.08)	(0.08)	(0.26)			
$RFE_{ij,t}$	-0.00	-0.04	-0.04	-0.00	-0.11	-0.04	-0.05
	(0.06)	(0.06)	(0.06)	(0.05)	(0.12)	(0.11)	(0.10)
$\ln(GDP_{it} + GDP_{jt})$	-2.01^a	-1.65^a	-1.69^a	-1.20^a	1.99	2.96^b	2.68^c
	(0.36)	(0.29)	(0.29)	(0.36)	(1.66)	(1.47)	(1.42)
$\ln INFRA_{jt}$	0.61^b	0.60^a	0.60^a	0.53^c	0.63^a	0.60^a	0.61^a
	(0.25)	(0.20)	(0.20)	(0.31)	(0.17)	(0.16)	(0.17)
$\ln PolCon_{jt}$	-0.47	-0.90^a	-0.89^a	0.07	-0.89^a	-0.30	-0.21
	(0.33)	(0.26)	(0.26)	(0.42)	(0.20)	(0.26)	(0.28)
$\ln KAOPEN_{jt}$	0.00	0.18^c	0.18^c	-0.07	0.17	0.08	0.08
	(0.10)	(0.09)	(0.09)	(0.17)	(0.11)	(0.12)	(0.13)
$BIT_{ij,t}$	0.32^a	0.26^a	0.29^a	0.35^a	0.16	2.33^a	
	(0.08)	(0.09)	(0.09)	(0.10)	(0.20)	(0.67)	
$BIT^{signed}_{ij,t}$			0.25				
			(0.19)				
$BIT^{North}_{ij,t}$							2.78^a
							(1.04)
$BIT^{South}_{ij,t}$							1.73^a
							(0.63)
Observations	2160	2792	2792	2740	2331	1665	1665
R^2	0.80	0.85	0.85	0.43	0.01	0.24	0.22
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	No	No	No
Country-pair fixed effects	No	No	No	No	Yes	Yes	Yes
Weak identification F-test	–	–	–	–	–	49.80^a	20.57^a
Sargan-Hansen Statistics	–	–	–	–	–	0.88	1.39

Robust standard errors in parentheses; ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

R^2 in column (5) computed as the square of correlation between the dependent variable and its fitted value.

4.2, I still find the positive impact of implemented BITs throughout. I begin with a sensitivity analysis in column (4) by changing the measurement of the dependent variable in order to control for divergent FDI attractiveness among the ASEAN countries. I use bilateral stock of FDI received by a host country as a share of home's total investment in ASEAN, $\frac{FDI_{ijt}}{FDI_{it}}$. The obtained BIT coefficient has remained significant and even slightly increased.

Next, it is still possible that these results may suffer from endogeneity. First, there could be any omitted country-pair characteristics, such as the quality of diplomatic relations and cooperation between states (Desbordes and Vicard, 2009), or membership in common regional economic integration, that are correlated with the likely negotiation of a BIT and may affect a home country's investment decision in the host country. Additionally, the causality between FDI and BIT may happen in both directions giving rise to simultaneity. This problem may be associated with selection bias as pointed out by Egger and Pfaffermayr (2004) in the sense that a host country has a higher chance of implementing a BIT with an important investment partner than with a less important partner. Columns (5) to (7) of Table 4.2 address these two sources of endogeneity, respectively.

The first source of endogeneity, omitted variables, is addressed in column (5) by including country-pair fixed effects, as in the case of trade gravity model (Bergstrand and Egger, 2007).[16] The impact of implementing a BIT remains qualitatively unchanged as the BIT coefficient is positive but turns out to be insignificant. The second source of endogeneity, simultaneity, is addressed in various ways. First, I apply an *ad hoc* solution by taking *BIT* variable by one year lag as in Neumayer and Spess (2005) and Haftel (2010). This method is rather convenient as it does not require external instrumental variables and can be estimated in both linear and non-linear models. Using PPML estimator with controls for country-fixed and year-fixed effects, I obtained the coefficient of lagged *BIT* being equal to 0.27 at 5 percent level, which does not deviate much of the baseline result in column (2) (I therefore omit the result in this table). Nonetheless, this method can have a drawback as endogeneity may remain at higher lagged values.

Alternatively, I consider instrumentation technique and apply the two-stage

16. I implemented *xtpqml* command in STATA which is a wrapper for *xtpoisson* (always with robust option) or *ppml* with control for country-pair fixed effects.

least square (2SLS) to the linear model. It is to be noted that a good instrument should influence ratification of a BIT between two countries but should not affect the amount of FDI between the home and the host countries. However, finding relevant external instruments can be challenging [17], I resort to internal instruments taking the lagged values of BIT evaluated at three and four years earlier. These lags are determined according to the first-stage F-statistics and the Hansen (1982)'s J-tests of over-identification. The first-stage F-statistics indicates that these instruments are relevant because the F-statistic is above the Stock and Yogo (2005)'s critical value at 5%, rejecting the null hypothesis of weak instruments. In addition, the Sargan-Hansen test of over-identification strongly accepted the null hypothesis that these lags are valid instruments. Column (6) provides the result of this regression which confirms my previous findings that the BIT coefficient is again positive and significant.

In column (7), I replicate the same regression as in column (6) but having separated the effect of ratifying a BIT with developed countries ($BIT_{ij,t}^{North}$) and with developing home countries ($BIT_{ij,t}^{South}$). [18] Results show that implementing a BIT with both the developed or developing country significantly induces higher FDI into the host states. Interestingly, although the Northern countries share a lower number of BITs implemented with ASEAN compared with the Southern countries, BITs with the North seem to be relatively more efficient in attracting FDI into ASEAN.

4.5.2 BITs and Their Indirect Role in Attracting FDI

I turn to investigate the indirect impact of BITs by testing the assumption that the effectiveness of BITs may be conditional on the extent of investment barriers in the host countries. To this end, results of the conditional model of the baseline gravity are reported in Table 4.3. In columns (1) and (2), the interaction terms between BIT and $\ln PolCon$ and between BIT and $\ln KAOPEN$ are introduced, respectively. I also look in columns (3) and (4) whether the con-

17. I have implemented a number of these instruments which all appear to be inconsistent. One of them is the number of total BITs that a pair of countries entered into with other third countries. This instrument reflects the degree that both countries open up to attract foreign capital and hence indirectly affect their decision to negotiate a BIT together. However, the first-stage F-statistic indicates that this variable is a weak instrument, and the BIT coefficient has turned out to be insignificant.

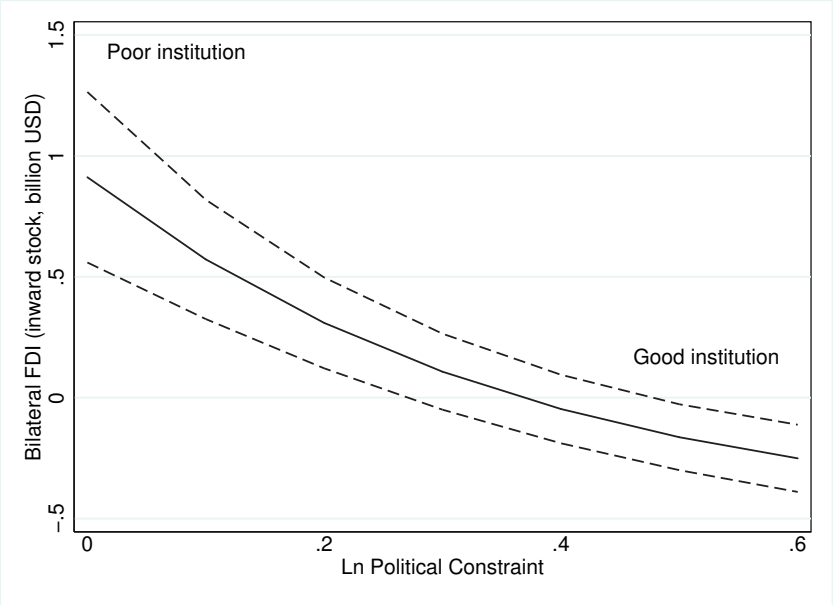
18. Developed economies are the OECD countries as of 1990 which is the first year of my dataset.

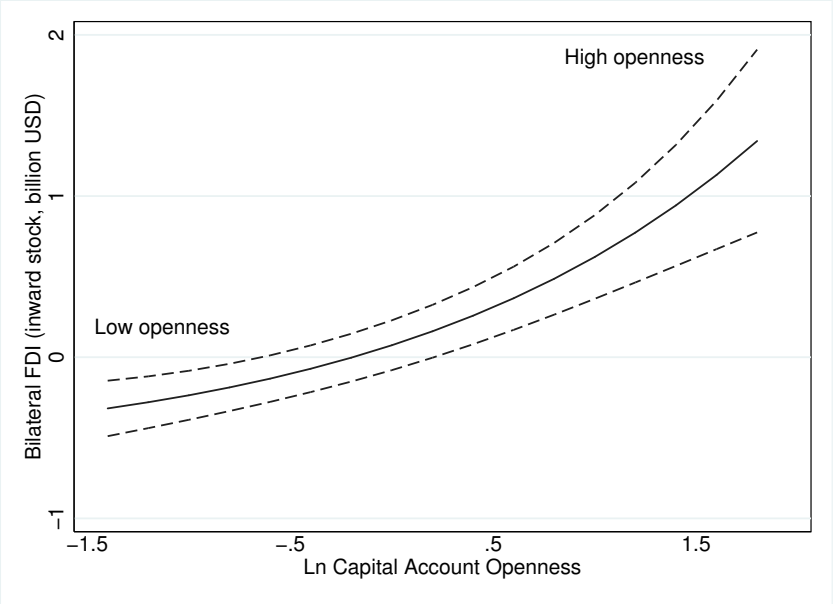
Table 4.3 – Conditional Effect of BITs on FDI (PPML estimator)

	(1)	(2)	(3)	(4)
Dependent Variable	FDI_{ijt}	FDI_{ijt}	FDI_{ijt}	FDI_{ijt}
$\ln GDP_{it}$	1.51^a	1.71^a	1.63^a	1.39^a
	(0.42)	(0.39)	(0.45)	(0.40)
$\ln GDP_{jt}$	1.61^a	1.73^a	1.64^a	1.65^a
	(0.41)	(0.40)	(0.41)	(0.39)
$\ln DIST_{ij}$	-0.93^a	-0.85^a	-1.00^a	-0.97^a
	(0.09)	(0.09)	(0.10)	(0.09)
$CONTIG_{ij}$	-1.15^a	-1.09^a	-1.34^a	-1.23^a
	(0.21)	(0.20)	(0.23)	(0.20)
$LANG_{ij}$	0.43^a	0.47^a	0.45^a	0.51^a
	(0.09)	(0.09)	(0.09)	(0.08)
COL_{ij}	0.64^a	0.60^a	0.64^a	0.54^a
	(0.08)	(0.08)	(0.08)	(0.08)
$RFE_{ij,t}$	0.07	0.10^b	0.08	0.10^b
	(0.05)	(0.05)	(0.05)	(0.05)
$\ln(GDP_{it} + GDP_{jt})$	-1.52^a	-1.77^a	-1.66^a	-1.35^a
	(0.29)	(0.29)	(0.31)	(0.28)
$\ln INFRA_{jt}$	0.58^a	0.64^a	0.58^a	0.62^a
	(0.19)	(0.18)	(0.19)	(0.18)
$\ln PolCon_{jt}$	-0.39	-0.87^a	-0.40	-0.85^a
	(0.29)	(0.25)	(0.29)	(0.25)
$\ln KAOPEN_{jt}$	0.17^c	0.03	0.17^c	0.04
	(0.09)	(0.09)	(0.09)	(0.09)
$BIT_{ij,t}$	0.72^a	0.10		
	(0.12)	(0.10)		
$BIT_{ij,t} \times \ln PolCON_{jt}$	-1.97^a			
	(0.29)			
$BIT_{ij,t} \times \ln KAOPEN_{jt}$		0.51^a		
		(0.07)		
$BIT_{ij,t}^{North}$			0.66^a	-0.11
			(0.12)	(0.11)
$BIT_{ij,t}^{South}$			0.51^c	0.34^b
			(0.27)	(0.14)
$BIT_{ij,t}^{North} \times \ln PolCon_{jt}$			-2.05^a	
			(0.30)	
$BIT_{ij,t}^{South} \times \ln PolCon_{jt}$			-0.26	
			(0.76)	
$BIT_{ij,t}^{North} \times \ln KAOPEN_{jt}$				0.57^a
				(0.08)
$BIT_{ij,t}^{South} \times \ln KAOPEN_{jt}$				-0.04
				(0.16)
Observations	2792	2792	2792	2792
R^2	0.88	0.89	0.88	0.89
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, ^{a} $p < 0.01$, ^{b} $p < 0.05$, ^{c} $p < 0.10$

Figure 4.4 – Total Effect of a BIT in force on Bilateral FDI in ASEAN at Various Levels of Domestic Institutional Quality and Financial Openness





ditional effects remain the same for the North-South and South-South types of BITs. The models are estimated using PPML estimator with controls on country-fixed and time-fixed effects.

In column (1), the negative coefficient on the interaction term confirms the expected role of BITs in substituting for good domestic institutions in the sense that they strengthen political credibility in attracting FDI. On the other hand, the positive interaction coefficient in column (2) rather suggests a complementarity between the effects of BITs and financial openness than their substitutability. Moreover, the BIT coefficient becomes insignificant in this regression. This does not imply that BITs no longer exert an impact on FDI because we must interpret the BIT coefficient taking into account its interaction term (see Brambor *et al.* (2006, pp. 71-72)).

The total effect of a BIT conditional on political constraint and financial openness are illustrated with the help of the Figure 4.4 on p. 126. It draws the total effect of entering into a BIT in force and its 95 % confidence intervals at various levels of political constraint and capital openness. Any particular point on these solid lines is calculated as $\frac{\partial FDI}{FDI} = \hat{\beta}_{10} + \hat{\beta}_{11} Barrier$ (for $Barrier$ being respectively $\ln PolCon$ and $\ln KAOPEN$). The downward solid line in the upper panel depicts the substitutability between a BIT and the level of political constraint: the entry into a BIT increases more bilateral FDI at a high level of political constraint, and this effect becomes smaller as the constraint diminishes. On the other hand, the upward line in the lower panel draws the complementarity between a BIT and the level of capital account openness: the effect of a BIT on FDI increases as controls on capital account loosen and thus enhance the positive effect of financial openness on FDI.

It would be interesting to see how the indirect effect differs between BIT^{North} and BIT^{South}, shedding light on the finding in column (1) that BITs with the North countries attracts more FDI. To this end, columns (3) and (4) distinguish the conditional impact of these treaties. The coefficients on the interaction terms in column (3) provide that substitutability between BITs and political constraint strongly contributes to the effectiveness of the North BITs while it is insignificant for South BITs. Result of the interaction terms in column (4) indicates that the previous finding in column (2) about the complementarity between BITs and the degree of capital openness is significantly attributed to BIT^{North} compared with BIT^{South}.

The evidence of a significant indirect impact of BIT^{North} suggests their effectiveness in mitigating investment barriers to increase FDI into the host countries. This indirect impact can be expected for barriers related to domestic institutions although not significantly for capital account openness. Such finding explains perhaps the objective that underlies the countries' intention to enter into a BIT with the ASEAN countries. It could be that the North home countries would implement a BIT in order to secure higher guarantees for their firms' assets when investing abroad. The South home countries, on the other hand, implement a BIT as a responsive act to FDI-friendly environment signaled by the host countries. This lends a support to why the stylized facts on ASEAN's BITs show that the North home countries have been less active in signing BITs with the ASEAN countries compared with the South home countries. Hence, the North countries prove to be more selective in choosing their signatory partners and only enter into BITs if they see the necessity to protect their foreign investment.

4.6 Conclusion

Like many other developing countries, the ASEAN governments have been resorting to BITs as one of the means to liberalize investment and to promote inflows of FDI. The number of BITs signed by the ASEAN countries has increased drastically since 1980s which amounted to 351 treaties by the end of 2011. The stylized facts also reveal countries' divergent interest in signing and ratifying the treaties with the ASEAN countries: while the North home countries signed a lower number of BITs compared with the South home countries, nearly all of these treaties have already been implemented. Many of the treaties signed by the South home countries are still left non-ratified, including BITs between the ASEAN countries themselves.

Despite increasing popularity of BITs, studies on quantitative impact of BITs are quite recent and their findings are still opened to debate. The issues that have been examined so far are the direct and indirect impacts of the treaties in attracting FDI. What has yet remained unexplored is whether the effectiveness of the treaties differs between developed and developing home countries and if so, what underlies this differing impact. Empirical analysis of a dataset that includes a sample of developed and developing home countries

as employed in this chapter can shed light on these new issues.

Applying the gravity model for FDI, I provide substantial evidence for the positive relationship between BIT and bilateral stocks of inward FDI into ASEAN, a result that is consistent with robustness controls on divergent FDI attractiveness across the host countries, a self-selection bias to form a BIT, and potential endogeneity. Both types of the North and the South treaties are efficient in increasing inward FDI but the impact is stronger for the North treaties. This could be explained by higher ratifying rate since I also find that signed but non-ratified treaties are not effective.

In addition, the effectiveness of BITs is crucially determined by the level of investment barriers prevailed in the host countries. I examine the barriers related to the quality of domestic institutions and controls on capital account. I find the evidence for the indirect impact of BITs in reducing these barriers to attract further FDI: the treaties tend to serve as substitutes for good domestic institutions although not necessary for prohibitive controls on capital account. This mechanism seems to drive the decision of the North home country to implement a treaty with the ASEAN host.

The overall finding in this analysis contributes to the literature on FDI determinants. According to the baseline regressions, market sizes, common language, colonial relationship, infrastructure quality are important factors in stimulating bilateral stocks of inward FDI into ASEAN. Bilateral distance discourages investment between two countries as predicted by the gravity model for FDI.

Finally, the analysis in this chapter leaves some room for future research. It would be interesting to distinguish the impact of different contents in a BIT rather than the fact of signing it because commitments stipulated in a BIT are likely to vary from one treaty to another. One can also explore disaggregate FDI data to investigate the relationship between investment decisions and BIT, by looking at the type of FDI that are more or less affected by BIT.

4.A Appendices

List of FDI source countries in the Dataset

List of FDI source countries			
developed economies		developing economies	
Australia	Norway	Argentina	Mexico
Austria	Portugal	Brazil	Myanmar†
Belgium-Luxembourg	Spain	Brunei Darussalam†	Pakistan
Canada	Sweden	Cambodia†	Panama
Denmark	Switzerland	Chile	Philippines†
Finland	United Kingdom	China	Poland
France	United States	Czech Republic	Russia
Germany		Estonia	Singapore†
Greece		Hong Kong	Slovenia
Ireland		Hungary	Thailand†
Italy		India	Turkey
Japan		Indonesia†	Vietnam†
Iceland		Korea	
Netherlands		Lao PDR†	
New Zealand		Malaysia†	

Superscript † assigns the ASEAN members.

Developed economies are OECD members as of 1990, which is the first year of the dataset.

Figure 4.5 – Distribution of FDI into ASEAN by Source Country

Percentage Share of Foreign Direct Investments Inflows into ASEAN by Source Country,2002-2009

(In percent)

Source Country	2002	2003	2004	2005	2006	2007	2008	2009	2002-2009
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ASEAN[1/]	**21.2**	**11.1**	**8.4**	**10.0**	**13.8**	**13.0**	**21.1**	**11.2**	**13.6**
REST OF THE WORLD[1/]	**77.5**	**88.2**	**91.2**	**88.4**	**83.4**	**85.7**	**78.2**	**88.5**	**85.2**
Asian NIEs	6.2	5.6	4.6	2.2	5.8	6.7	9.6	9.3	6.4
Hong Kong	2.7	0.9	1.2	1.4	2.2	2.0	2.9	4.0	2.2
South Korea	1.0	2.3	2.3	1.3	2.2	3.7	3.2	3.6	2.7
Taiwan (ROC)	2.5	2.4	1.1	-0.5	1.4	1.1	3.5	1.7	1.5
China	-0.4	0.8	2.1	1.5	1.9	2.3	4.3	3.8	2.3
India	0.5	0.4	0.2	1.0	-0.5	2.0	1.4	2.5	1.1
Japan	16.8	16.1	16.0	16.3	18.5	11.9	9.4	13.4	14.3
EU	20.8	27.6	31.9	27.7	23.4	23.9	19.2	18.4	23.9
Other Europe[2/]	4.6	7.7	4.6	12.0	9.5	4.3	3.5	-1.2	5.6
Canada	2.1	0.4	2.4	1.8	0.5	0.5	1.6	0.8	1.1
USA	-1.2	6.2	12.4	7.9	5.4	10.8	10.4	8.5	8.4
Australia	0.4	0.6	1.4	0.5	0.6	2.0	1.9	1.8	1.3
New Zealand	0.6	0.4	-0.1	1.3	-0.4	0.1	-0.3	0.6	0.2
All OTHERS[3/]	27.1	22.4	15.6	16.1	18.9	21.2	17.2	30.6	20.5
Subtotal[1/]	**98.7**	**99.3**	**99.6**	**98.3**	**97.2**	**98.7**	**99.4**	**99.6**	**98.7**
Reinvested earnings in the Philippines [4/]	1.3	0.7	0.4	0.3	2.0	0.8	0.1	0.2	0.8
Inter-company loans in Philippines [5/]	-	-	-	1.3	0.9	0.5	0.5	0.1	0.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

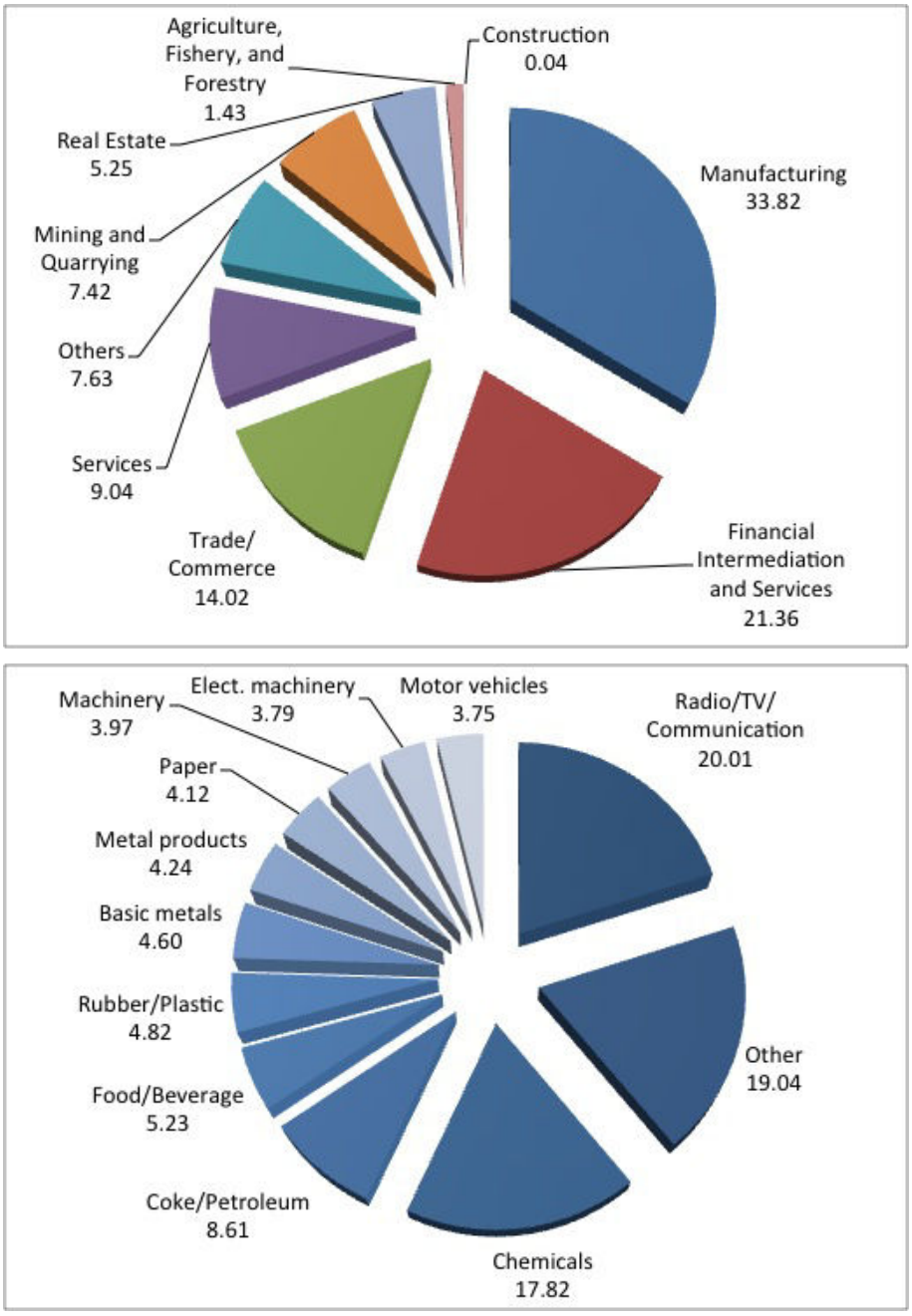
Share of ASEAN Member Countries in Intra-ASEAN Foreign Direct Investments Inflows 2002-2009

(In Percent)

Source Country	2002	2003	2004	2005	2006	2007	2008	2009	2002-2009
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Brunei Darussalam	0.5	-0.2	0.6	0.7	-0.5	0.0	1.0	0.5	0.3
Cambodia	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.3	0.1
Indonesia	8.4	9.6	9.8	3.2	8.0	2.7	8.9	20.8	8.1
Lao PDR	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.1
Malaysia	27.5	22.7	24.0	30.2	9.9	11.1	30.3	29.8	21.7
Myanmar	0.3	0.3	0.2	0.3	0.5	0.7	0.4	1.5	0.6
Philippines	0.6	-0.5	5.4	1.8	1.9	1.7	1.2	2.2	1.7
Singapore	53.6	62.3	53.9	63.5	76.3	73.7	51.4	57.1	62.9
Thailand	7.2	5.3	5.8	0.2	3.2	8.4	5.3	-5.1	4.3
Viet Nam	1.7	0.2	0.2	0.2	0.1	1.6	1.3	-7.1	0.1
ASEAN[1/]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: ASEAN Statistical Yearbook 2010, pp.114-115.

Figure 4.6 – Distribution of FDI Inflows by Economic Sectors (above) and Approvals of FDI in Manufacturing Sector (below), 1999-2007 (%)



Source: Statistics of Foreign Direct Investment in ASEAN 2008 (10^{th} edition).

Table 4.4 – Distribution of BITs in ASEAN by ASEAN Major FDI Sources (1960-2011)

BITs (signed)	ASEAN	Developed				Developing					Total
		EU15/ EFTA	Japan	CAN-USA	AUS/ NZL	China	Asian NIEs	South Asia	Europ. Trans.	Other	
Brunei Darussalam	0	1	0	0	0	1	1	1	0	2	6
Cambodia	7	5	1	0	0	1	2	1	2	2	21
Indonesia	7	11	0	0	1	1	2	5	14	21	62
Lao PDR	7	7	1	0	1	1	1	3	1	1	23
Myanmar	4	0	0	0	0	1	0	1	0	0	6
Malaysia	4	11	0	0	0	1	3	6	12	28	65
Philippines	5	12	0	1	1	1	2	4	3	4	33
Singapore	3	6	0	1	0	1	2	5	12	11	41
Thailand	6	7	0	1	0	1	4	3	9	7	38
Vietnam	8	13	1	0	1	1	3	4	13	12	56
Total	51	73	3	3	4	10	20	33	66	88	351
Share in Total (%)	15	21	1	1	1	3	6	9	19	25	100

BITs (in Force)	ASEAN	EU15/ EFTA	Japan	CAN-USA	AUS/ NZL	China	Asian NIEs	South Asia	Europ. Trans.	Other	Total
Brunei Darussalam	0	1	0	0	0	0	1	1	0	0	3
Cambodia	2	4	1	0	0	1	1	0	2	0	11
Indonesia	5	10	0	0	1	1	1	5	10	12	45
Lao PDR	4	7	1	0	1	1	1	2	1	1	19
Myanmar	1	0	0	0	0	1	0	1	0	0	3
Malaysia	2	11	0	0	0	1	3	5	9	16	47
Philippines	3	11	0	1	1	1	2	3	3	3	28
Singapore	3	6	0	1	0	1	2	5	10	7	35
Thailand	5	7	0	1	0	1	4	3	7	5	33
Vietnam	6	11	1	0	1	1	2	2	11	5	40
Total	31	68	3	3	4	9	17	27	53	49	264
Share in Total (%)	12	26	1	1	2	3	6	10	20	19	100

Souce: Author's calculation from UNCTAD's BITs database

Table 4.5 – Summary Statistics and Matrix of Correlations

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Obs.**
I: FDI	0.48	2.16	-2.15	33.26	5,741
II: ln GDP home	5.18	1.82	-0.05	9.37	6,305
III: ln GDP host	3.45	1.61	-0.05	5.45	5,805
IV: ln Distance	8.57	0.93	5.75	9.87	6,494
V: Contiguity	0.07	0.26	0	1	6,494
VI: Common language	0.07	0.26	0	1	6,494
VII: Colonial relationship	0.03	0.16	0	1	6,494
VIII: RFE	1.4	1.49	-2.94	6.86	3,421
IX: ln GDP(home+host)	5.72	1.32	1.22	9.39	5,622
X: ln Infrastructure	-0.2	0.43	-1.32	0.96	6,494
Xl: ln KAOPEN	-0.03	1.02	-1.38	1.63	5,767
XII: ln PolCon	0.2	0.2	0	0.55	5,861
XIII: BIT	0.18	0.39	0	1	6,494

Variables	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I:	1.00												
II:	0.25	1.00											
III:	0.16	-0.01	1.00										
IV:	-0.01	0.43	0.09	1.00									
V:	0.01	-0.22	-0.08	-0.53	1.00								
VI:	0.22	0.04	0.15	-0.08	0.09	1.00							
VII:	0.16	0.18	-0.01	0.12	-0.04	0.09	1.00						
VIII:	-0.04	0.04	-0.00	0.07	-0.12	-0.04	0.01	1.00					
IX:	0.30	0.90	0.24	0.38	-0.21	0.05	0.19	0.00	1.00				
X:	0.20	-0.02	0.46	0.01	-0.06	0.25	-0.01	-0.48	0.08	1.00			
XI:	0.17	-0.01	0.57	0.08	-0.10	0.25	0.00	-0.33	0.14	0.61	1.00		
XII:	0.01	0.01	0.30	0.05	-0.02	0.02	-0.01	0.06	0.07	0.05	0.13	1.00	
XIII:	-0.03	0.05	0.21	0.03	-0.00	-0.04	-0.00	0.05	0.10	0.12	-0.02	-0.06	1.00

Table 4.6 – Conditional Effect of BITs on Predicted Values of FDI

Range of ln(PolCon)	Total Effect	Std. Err.	95% Conf. min.	Interval max.	Countries in Range in 2007
0.00	0.91[a]	0.18	0.56	1.26	–
0.10	0.57[a]	0.13	0.33	0.82	Indonesia, Lao PDR, Myanpar, Vietnam
0.20	0.31[a]	0.10	0.12	0.50	Philippines
0.30	0.11	0.08	-0.05	0.26	Thailand
0.40	-0.05	0.07	-0.19	0.09	Cambodia
0.50	-0.16[b]	0.07	-0.30	-0.03	Malaysia
0.60	-0.25[a]	0.07	-0.39	-0.11	Singapore
Range of ln(KAOPEN)					
-1.40	-0.32[a]	0.09	-0.49	-0.15	–
-1.00	-0.24[a]	0.08	-0.39	-0.08	Myanmar
-0.60	-0.13[c]	0.07	-0.28	0.01	Lao PDR, Thailand, Vietnam
-0.20	0.00	0.08	-0.15	0.15	–
0.20	0.16[c]	0.08	0.00	0.32	Malaysia, Philippines
0.60	0.37[a]	0.10	0.17	0.56	–
1.00	0.62[a]	0.13	0.36	0.88	Indonesia
1.40	0.94[a]	0.19	0.57	1.32	Cambodia
1.80	1.34[a]	0.29	0.77	1.91	Singapore

Results based on columns (1) and (2) in Table 4.3 [a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$

Chapter 5

General Conclusion

This thesis deals with quantitative studies on economic impacts of ASEAN integration in the areas of trade and investment liberalization from the perspective of new economic geography (NEG). It contributes to a gain of basic insights on what the ASEAN countries can expect from the upcoming ASEAN Economic Community (AEC) in 2015 in order to prepare for the benefits and challenges that lie ahead.

The three empirical studies in this dissertation go along the line of the principal empirical research agenda in NEG: on the one hand, the works around market access which aim at investigating the impact of agglomeration mechanism on economic performance (Chapters 2 and 3); and on the other hand, the works applying the gravity relationship which aim at investigating determinants of spatial interaction forces (Chapter 4). Empirical strategies that have been explored deal essentially with the measurements of trade costs and market access, which are important ingredients in NEG models. In addition, following the empirics of international trade literature, recent econometric methods have been implemented to estimate gravity models for trade and FDI.

To a large extent, the process of ASEAN trade and investment integration meets with the predictions of the NEG models: locations with good market access are attractive as export locations (Chapter 2); although production factor prices are also relatively higher there (Chapter 3); and that spatial relationship between two economic entities decreases in their distance (Chapter 4). The evidence provided by Chapters 2 and 3 suggests that improved proximity to markets represents a benefit to the growth of ASEAN's manufacturing exports although deepening integration potentially leads to economic imbalances be-

tween countries. The bottom line is that, as markets are becoming spatially related through growing integration, economic dynamism of the partner countries, both intra- and inter-regional, can exert influence on ASEAN's own trade and economic performance. Meanwhile, the gravity relationship in Chapter 4 suggests that FDI attractiveness depends also on the host country's business environment, such as domestic institutions and capital openness. Implementing a measure to liberalize investment barriers through, for instance, bilateral investment treaties (BITs) proves to be effective in promoting inflows of FDI in the ASEAN context.

The scope of this thesis remains beyond a comprehensive study on the entire list of ASEAN's integration goals posited in the AEC Blueprint. Nevertheless, it conveys some policy implications regarding the achievement of a number of objectives. These goals are crystallized into a twofold integration challenge, viewed as external and internal to ASEAN. The external challenge addresses the relationship between ASEAN and the rest of the world, i.e., in how the ASEAN countries can attain a free flow of goods, investment and capital, while continuing to sustain integration into global economy. [1] In addition, the internal challenge deals with the principal difficulty in how the ASEAN countries can cope with economic disparities between themselves as the region is opening up. The findings in this dissertation shed light on the prospect of some action plans as indicated in the AEC Blueprint.

Promoting regional and global economic integration: The conclusions drawn from Chapters 2 and 4 recommend how ASEAN can promote regional and global economic integration through trade and investment liberalization.

First, in the domain of external trade, the measure of trade costs constructed in Chapter 2 reveals that barriers to intra-regional manufacturing trade have been significantly reduced in the past decades which highlights the effectiveness of the entry into effect of ASEAN Free Trade Area—AFTA (1992). Nevertheless, inter-regional barriers remain relatively high, which implies that additional effort is required to lower these barriers in order to sustain ASEAN's openness.

As to how the ASEAN countries should pursue intra- and inter-regional trade liberalization policies, the focus should be given to the area of non-tariff components of trade barriers. The ASEAN countries would benefit from policy

1. The Blueprint also specifies a free flow of service and skilled labor within ASEAN.

actions, such as, enhancing transparency of non-tariff measures, harmonizing trade facilitation in order to meet with international standards, or integrating custom procedures as to increase timeliness and reduce unnecessary administrative costs.

In addition, cross-industry results provide that, given the differing characteristics of goods that directly determine the level of trade costs, the ASEAN countries may face difficulties in accelerating some of the Priority Integration Sectors (e.g., automotive, rubber and wood-based products, agro-based goods). These features essentially include the degree of demand for product varieties, transportability (in terms of weight-to-value ratio), or perishable nature of goods. Efficient logistical services to support cross-border transports can help reducing excessive trade costs prevailing in trade of these goods. This finding reassures ASEAN's decision made in 2006 to extend the Priority Integration Sectors to include the logistic sector.

Aside from logistic services, domestic and international trade of the ASEAN countries can be promoted to a larger extent through improvements of linkages and connectivity of transport infrastructure as well as through development of transport facilitation in the areas of air and maritime transport sectors. In particular, regional efforts to liberalize air and maritime sectors can greatly contribute to the effectiveness of cross-border transport facilitation. However, developing regional infrastructure network requires significant budget and management expertise; ASEAN can mobilize funding and reach for technical advise from dialog partners in developed countries and well as from international financial institutions/organizations (e.g., the Asian Development Bank—ADB, the World Bank, the Economic and Social Commission for Asia and the Pacific—ESCAP).

The last evidence from Chapter 2 displays a positive and significant relationship between manufacturing export performance and market access in addition to the role of countries' comparative advantage and competitive export environment. The relevance of economic geography in explaining countries' export performance suggests that promoting trade integration through the aforementioned measures will enhance and multiply linkages between producer and consumer markets, thereby transforming ASEAN into a single and production base. Integration facilitates the development of supply chain between different production sites, either intra- or inter-regional, which is expected to boost

exports of intermediate inputs and final goods of the ASEAN countries.

As for the free flow of investment, the findings in Chapter 4 provide evidence that the ASEAN countries would reap the benefits from directly implementing a policy measure to liberalize investment in ASEAN. Moreover, there is the expected indirect effect that the measure should enhance further inflows of FDI through a reduction of investment barriers related to institutions and capital regulations by acting as substitutes for a sound investment climate. This chapter, however, yields some consequence on ASEAN's regional policies on investment. Since investment policies, e.g., national treatment, competition policy, protection of property, and financial institutions among others, are likely to vary among the countries, regional coordination of these regulations will effectively establish a sound investment climate in ASEAN. This calls for the strengthening and acceleration of the ASEAN Comprehensive Investment Agreement—ACIA (2009), which is built on the existing Framework Agreement on the ASEAN Investment Area—AIA (1998) and on the ASEAN Agreement for the Promotion and Protection of Investment or commonly referred to as ASEAN Investment Guarantee Agreement—IGA (1987).

Promoting harmonious integration while mitigating economic imbalances: Given strong economic disparities between the ASEAN members, the analysis in Chapter 3 points out that one direct consequence of deepening regional integration is the strengthening of the core-periphery pattern of the regional economy, favoring relocation of industrial activities in a small number of regions. Moreover, taking into account the cumulative causation of the agglomeration mechanism, the ASEAN-CMLV countries may face additional difficulties in integrating into global and regional markets due to their smaller market sizes.

Promotion of equitable economic development is stipulated in the Initiative for ASEAN Integration—IAI (2000) in order to ensure that all the member countries share the benefits of the integration. In addition to the gain from improved physical infrastructure, income transfer policies may mitigate the widening of income gaps between countries. However, in the long run, key to harmonious integration can include technical assistance provided to the ASEAN-CLMV countries in order to catch up on production and communication technologies, human resource development, and effective institutional

management.

Finally, the dissertation leaves some issues for future research. The upcoming ASEAN common market cannot be complete without free movement of skilled labor. This is one of the important features of the AEC which remains unexplored in this thesis. Since the issue of labor mobility has always triggered a premonition of immigration impact, it would be interesting to investigate economic effect of labor migration in shaping new economic centers in ASEAN as would be predicted by the core-periphery model. To my knowledge, this agglomeration mechanism has not been explored yet in the entire ASEAN context. In addition, in terms of analytical approach, the three empirical chapters covered in this thesis deal with the studies in macro level, i.e., the spatial relationship and the resulting impact at the country level. A possible venue for another research agenda could be the investigation of these effects at finer geographical units providing the availability of required data.

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